TAKEX

Welding Point Detector

INSTRUCTION MANUAL

MODEL SWD55

- Use it properly in accordance with the instruction manual and the delivery specification.
- Keep an instruction manual carefully.
- Approve the specification of this product and a contour dimension because it may be changed to the one without the notice.
- The guarantee period of this product is one year after the delivery.
- When a problem by out responsibility arises in the quarantee period of this product. It lets me do only the repair of the part of the problem or the exchange of the problem product.
- Each our product doesn't have a control function such as the prevention of disasters and the prevention of the accident as a product's own function.
- Approve it because our company isn't responsible for the damages due to the disaster if it occurred in the one related to the machine which these products were used for, the accident, and so on and others.

TAKENAKA ELECTRONIC INDUSTRIAL CO.,LTD.

Welding Point Detector

SWD55

INSTRUCTION MANUAL

- Prior to your use, carefully read this manual.
- After reading, securely file and keep the manual.

Contents

Welding Point Detector
MODEL SWD55

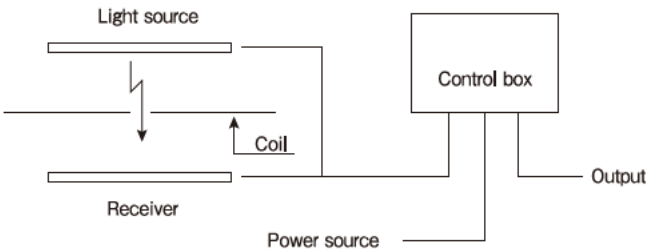
1. General

The SWD55 is used to detect punched holes in the vicinity of the weld zone of a coil which is continuously travelling on the cold-rolling equipment.

2. System configuration

The SWD55 consists of the following three units.

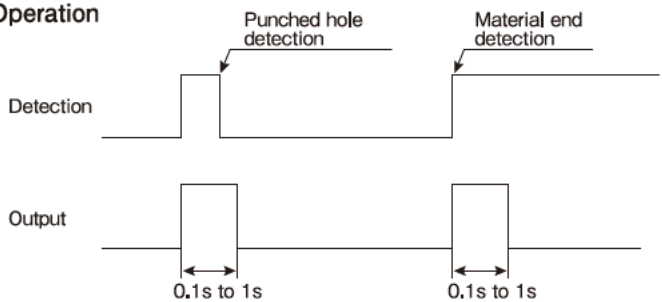
1. Light source : Type SWD55L
2. Receiver : Type SWD55R
3. Control box : Type SWD55B



3. Features

- **Infrared LED employed for light source**
  This special arrangement prevents lamp burn-out so often as conventional, thus eliminating the need for lamps re-placement.
  Service life is high and reliability is assured.
- **High excess gain**
  The unit has a capacity of sensing as small as 8mm diameter holes, and both light source and receive circuits provide excellent excess gain of more than 30 times as high as the conventional switches of this type, thus achieving stable detection, even when the lenses are stained.
- **Simple optical axis adjustment**
  The unit contains seperate light source and receiver used for optical axis adjustment: when the optical axis is aligned, the lamp lights, thereby making optical axis adjustment simple and accurate.
- **Completely vibration-proof and water-tight**
  The light source and receiver has a highly durable structure designed to withstand use at whatever work site.
  They employ the case and construction whose quality has been proven in the manufacture of our press safety device.
- **Low power consumption and compactness**
  Streamlined circuitry design substantially reduces power consumption to a minimum.
  The light source and receiver are modularized, thus reducing the size to approx. one half the conventional.

4. Operation



5. Specifications

5－1 Detecting conditions

Minimum plate width : 350㎜ (when plate does not meander) (See Note 1.)

Note 1. When a plate meanders, the minimum plate width increases by its meandering amount.

Example : The minimum plate width when the plate meanders ±100㎜ is:

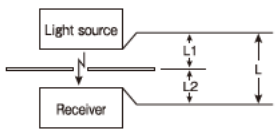
Min. plate width ＝ 350㎜＋|Meandering width|×2＝ 350＋100×2＝550㎜

Line speed : 750m/min. (Max.)

Punched hole size : φ10㎜ (Min.)

5－2 Detector

Specification

Type	S W D 5 5 L	S W D 5 5 R
Setting distance	Light source to receiver L ＝ 400 to 1,000㎜ Light source to coil L 1 ＝ 200㎜ Min. Receiver to coil L 2 ＝ 200㎜ Min. 	
Control power	Supplied from control box	
Effective detecting width	300㎜	
Light source	Infrared light-emitting diode (wave length: 950nm)	
Connections	By metal connector (no cable supplied) For compatible cables, refer to the connection diagram.	
Weight	approx. 3kg	approx. 3kg

Environment

Operating temperature range	−10℃ to +55℃
Construction	I P 6 6
Withstand voltage	One minute at AC 500V between power source and case One minute at AC 500V between output and case (only light receiver)
Insulation resistance	20MΩ or more at DC 500V megger between power source and case 20MΩ or more at DC 500V between output and case (only light receiver)

5－3　Control box

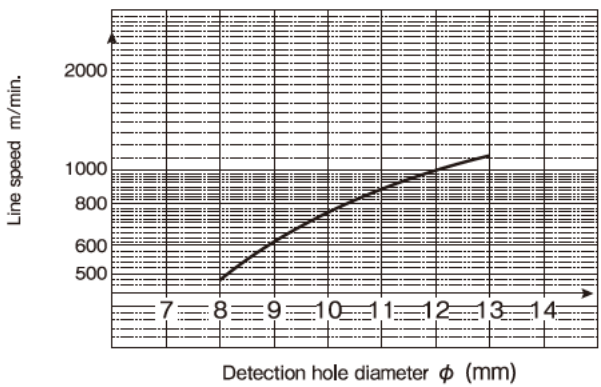
Specification

Type	S W D 5 5 B
Output	Relay contact 1C and open collector output Light-ON
Output rating	Relay contact: AC250V, 5A or less (Resistance load) Open collector output DC48V 75mA or less Transistor conducts during outputting.
Operation	One shot output 0.1 to 1s variable
Relay used	HH52P DC24V manufactured by Fuji Electric FA Component & Systems Co., Ltd. AP3222 manufactured by Panasonic
Response speed	25ms or less
Control power	AC 100V to 110V/200V to 220V common Rated voltage ＋10% －15% 50/60Hz
Corrent consumption	20W or less
Connections	By terminal board
Weight	Approx. 8.7kg

Environment

Operating temperature range	－10℃ to ＋55℃
Construction	I P 4 0
Withstand voltage	One minute at AC 1,500V between power/output and case One minute at AC 1,500V between power source and output
Insulation resistance	20MΩ or more at DC 500V megger between power/output and case 20MΩ or more at DC 500V megger between power source and output

5－4　Data (Line speed : Detection hole diameter)



6. Installation, Wiring Method and Optical Axis Adjustment

6－1　Detector

■ For light source installation, refer to the light source and receiver installation drawing (P9) attached.

6－2　Control box

■ The control box is of a wall-hung type: Use M8 bolts and nuts to secure it to the wall. For installation pitch, refer to the external dimension drawing (P13).

■ The control box is constructed to be dust-proof (IP40) :
Avoid mounting it at a site subjected to water drips.

6－3　Wiring

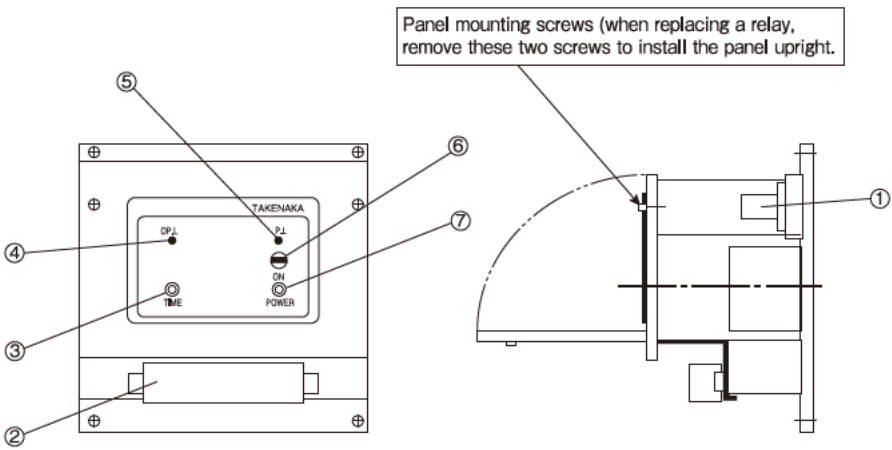
■ For wiring method, refer to the connection diagram (P8).

6－4　Optical axis adjustment

■ Locate the detector and control box, and complete wiring connections, then adjust optical axis for the light source and receiver in the following procedures.

6－4－1　Description of front panel, etc.

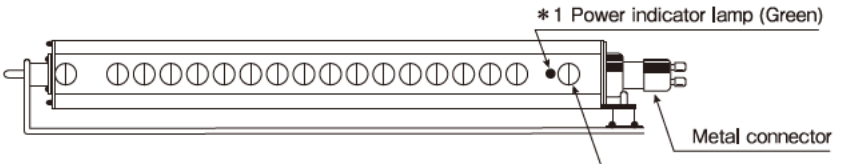
■ Control box (internal construction)



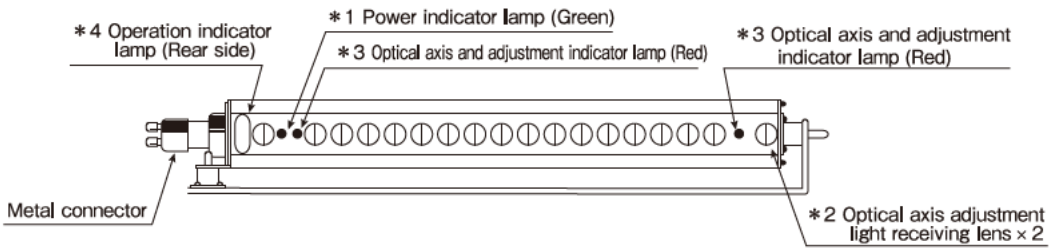
Coating color : Munsell 7.5BG 6/1.5

No.	Description	
1	Relay	HH52P DC24V manufactured by Fuji Electric FA Component & Systems Co., Ltd. AP3222 manufactured by Panasonic
2	Terminal board	
3	Output time adjust VR	The time is extended by turning this VR clockwise.
4	Operation indicator lamp	Red
5	Power indicator lamp	Green
6	Fuse	1A
7	Power switch	

■ Light source



■ Receiver



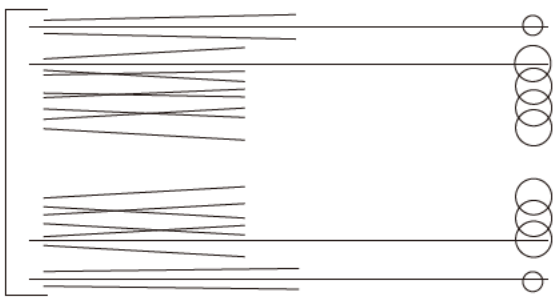
6－4－2　Optical axis adjustment

■ Turn control box power switch ON, and ensure that the respective power indicator lamps for control box (No. 5 Green), projector (＊1 Green) and light detector (＊1 Green) are lit.

■ Then, with the light source directing straight toward the receiver, fix it firmly.
At this time, if the optical axis adjustment indicator lamps (＊3 Red) provided at the right and left sides of the receiver lens surface light, it indicates that the optical axis adjustment is completed.

■ Beam spot

Light source



◆ The beam spots at both sides (＊2) are reduced as illustrated. These are used for optical axis adjustment. Punched hole detection is done using inner 16 beam spots.

◆ Alignment of the optical axis with optical axis adjustment beam spots produces no deviation from optical axis, since the detecting beam are wide.

■ Receiver operation indicator lamp

Windows for operation indicator lamps are provided at the case rear. (＊4 Red)

OP.L Arrangement

A and B on the left illustration are optical axis adjustment operation indicator lamps (OP.L) : They are interlocked with the optical axis adjustment indicator lamps on the lens. These lamps light when light enters.

Upon completion of the optical axis adjustment, tighten the light source and receiver mounting screws, and ensure that all the above indicator lamp are lit.

■ Check each performance in the following manner.

① Place a light shield between the light source and receiver for complete cut-off of light. (with Coil provided)

② Remove the light shield, and the operation indicator lamps light.
At the same time, the control box operation indicator lamps (OP.L) light only for the one-shot time, then they go off. The relay output also operates only for the one-shot time.

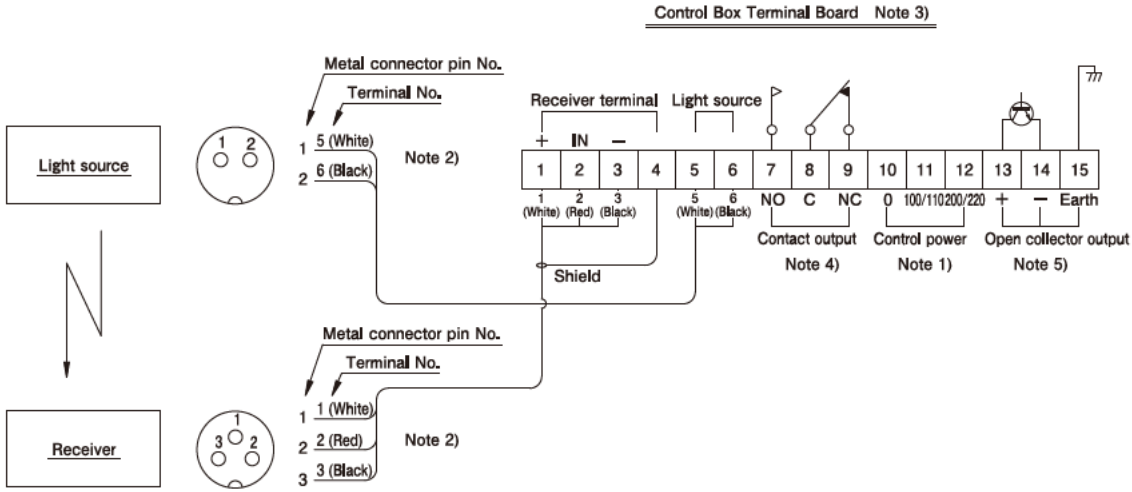
7. Maintenance and Inspection

■ Periodically check the front glass surface at the light source and receiver, and clean if soiled. Unclean glass may cause maloperation.

■ Also chek for looseness in the light source and receiver mounting bolts.
Loose installation will cause deviation in optical axis and erroneous operation.

■ Then, ensure that all operation indicator lamps are lit when light enters.
If even one of them is not lighting when light is in, the optical axis presumably deviates; in this case, re-adjust the optical axis.

CONNECTION DIAGRAM



Note 1) ＊ When control power is AC 100V to 110V, connect to terminals ⑩—⑪.
＊ When control power is AC 200V to 220V, connect to terminals ⑩—⑫.

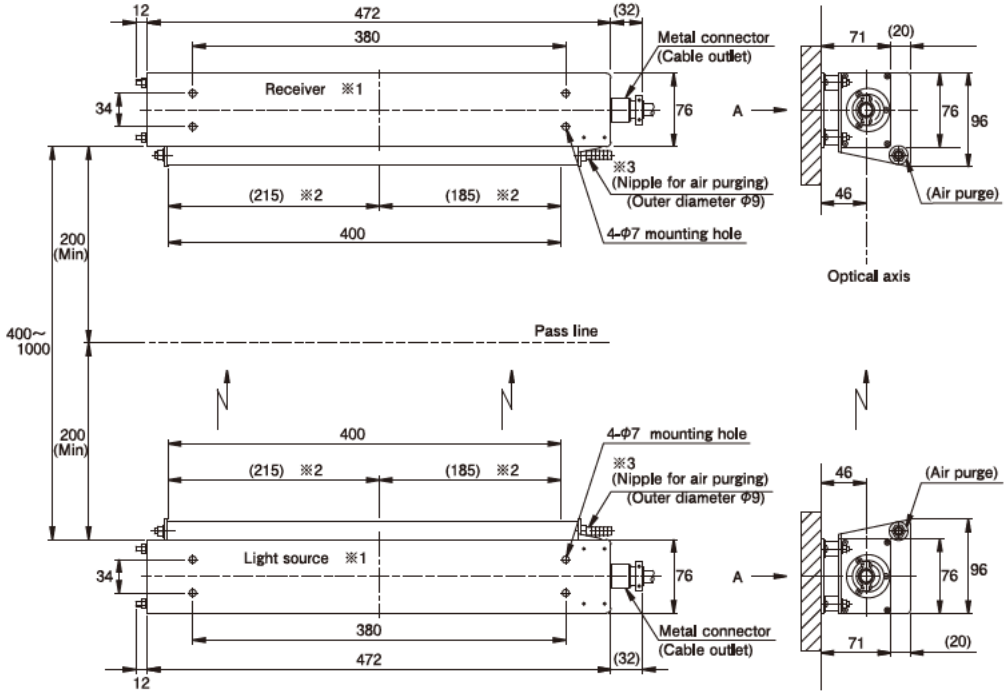
Note 2) ＊ Be sure to use shielded wires for receiver cables.
The receiver terminal has a polarity: always align Pin No. of metal connector with terminal board No.
＊ The light source has no polarity.
＊ Compatible cables
① Projector ←——→ Control box : 2㎟×2–core cable O.D. φ10.1 to φ12
② Light detector ←——→ Control : 2㎟×3–core shielded O.D. 1φ10.1 to φ12
＊ The maximum wiring distance between control box and detector is 100m.

Note 3)
＊ For connection of control box to terminal board, use solderless terminals for M4.

Note 4)
＊ Rating AC 250V 5A (Non-induced load)
＊ When punched holes are detected, the relay is energized only for the one-shot time.

Note 5)
＊ Rating DC 48V 75mA Max.
＊ When punched holes are detected, output transistor conducts only for the one-shot time.

SET-UP (in mm)



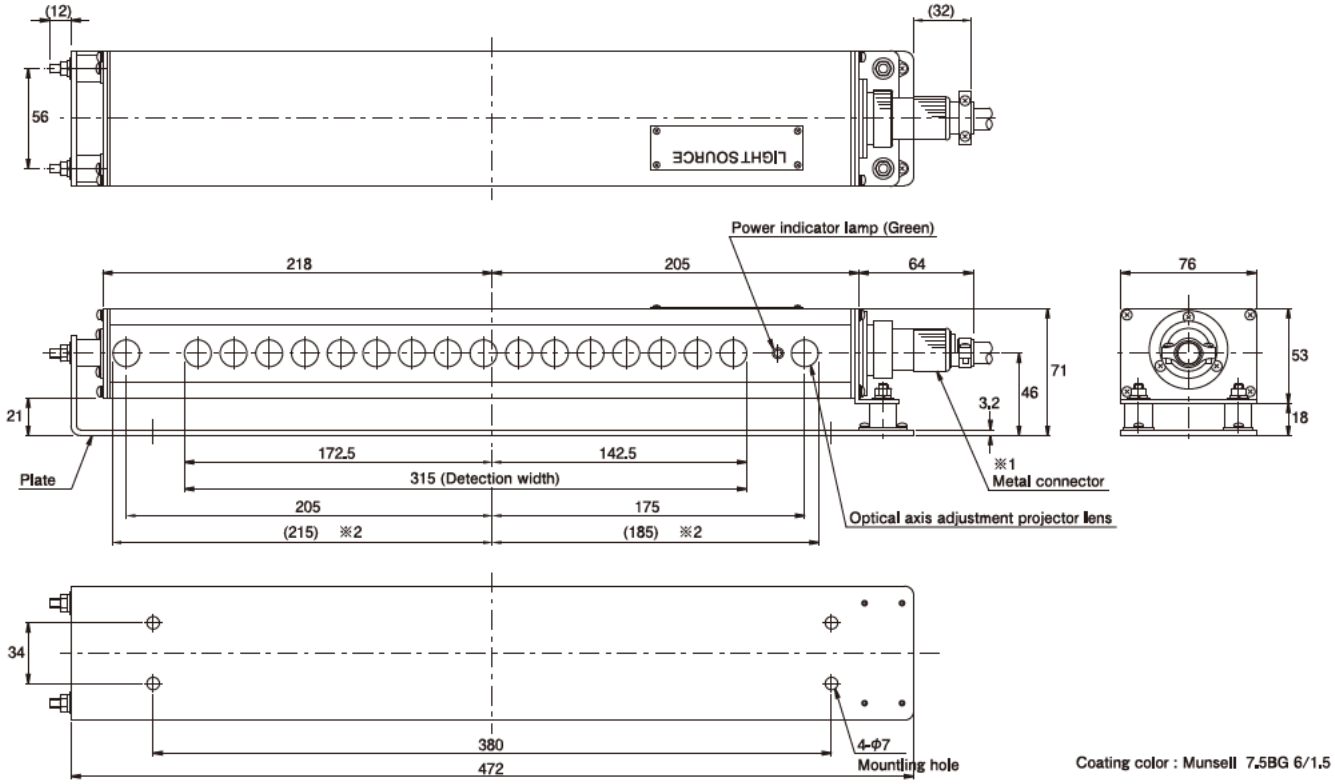
This drawing is as viewed in the arrow A direction.

※1 Light source/receiver mounting direction :
No mounting direction is specified; however, where sparks or external strong light is present, set them so that no light reflected from the pass line enters the receiver.

※2 Opening :
This dimension is required for light detection and optical axis adjustment. When mounting the installation base and protecting plate, etc., always open this section.

※3 Air purging (Special order specification) :
Standard specifications do not include air purging. Air purging arrangement is available by special order specification.
Withstand pressure : 0.3MPa
Purging rate : 200ℓ/min

LIGHT SOURCE (in mm)
SWD55L

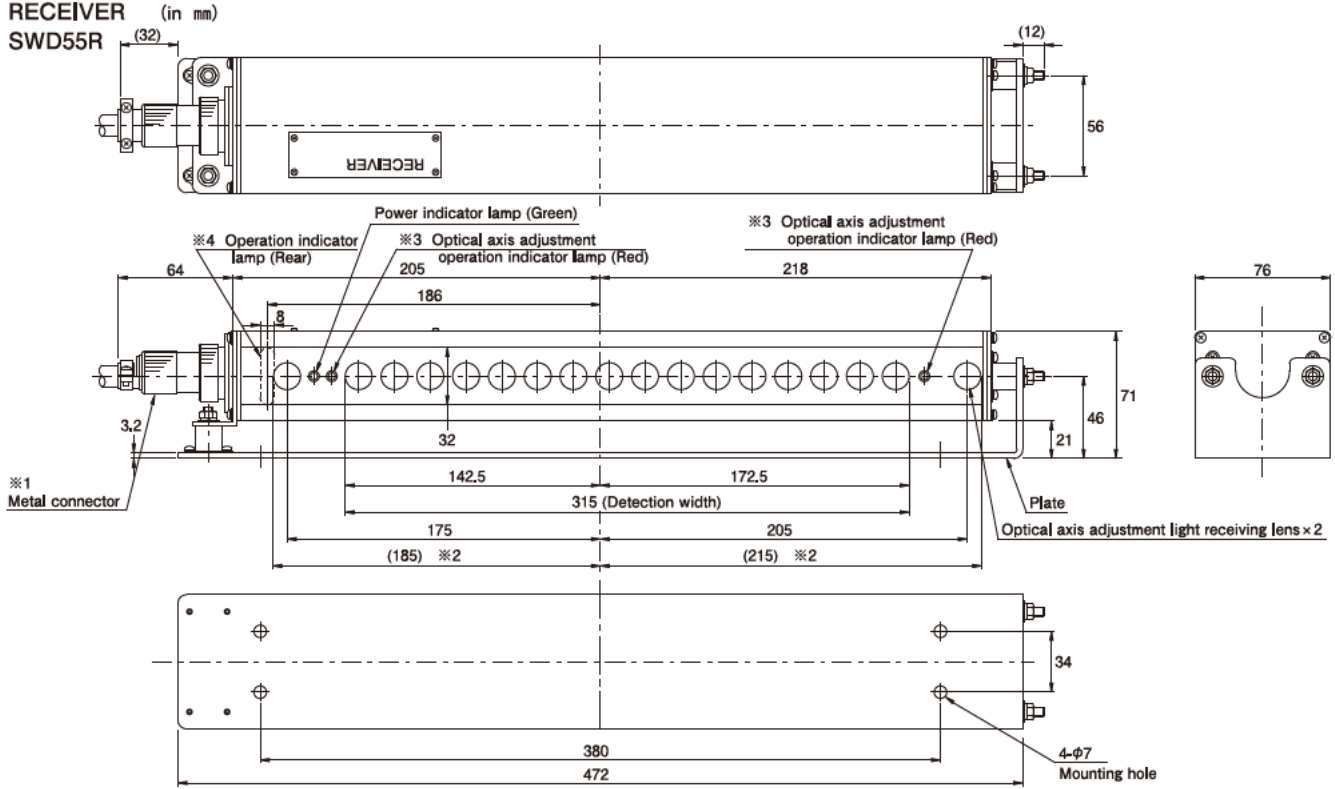


Coating color : Munsell 7.5BG 6/1.5

※1 Metal connector :
Applicable cable : 2㎟×2–core shielded cable Cable outside diameter : Φ10.1 to Φ12

※2 Opening :
This opening is required for light detection and optical axis adjustment.
When installation base, protecting plate or the like is to be mounted, be sure not to shield this area.

RECEIVER (in mm)
SWD55R



※1 Metal connector :
Applicable cable : 2㎟×3-core shielded cable Cable outside diameter : Φ10.1 to Φ12

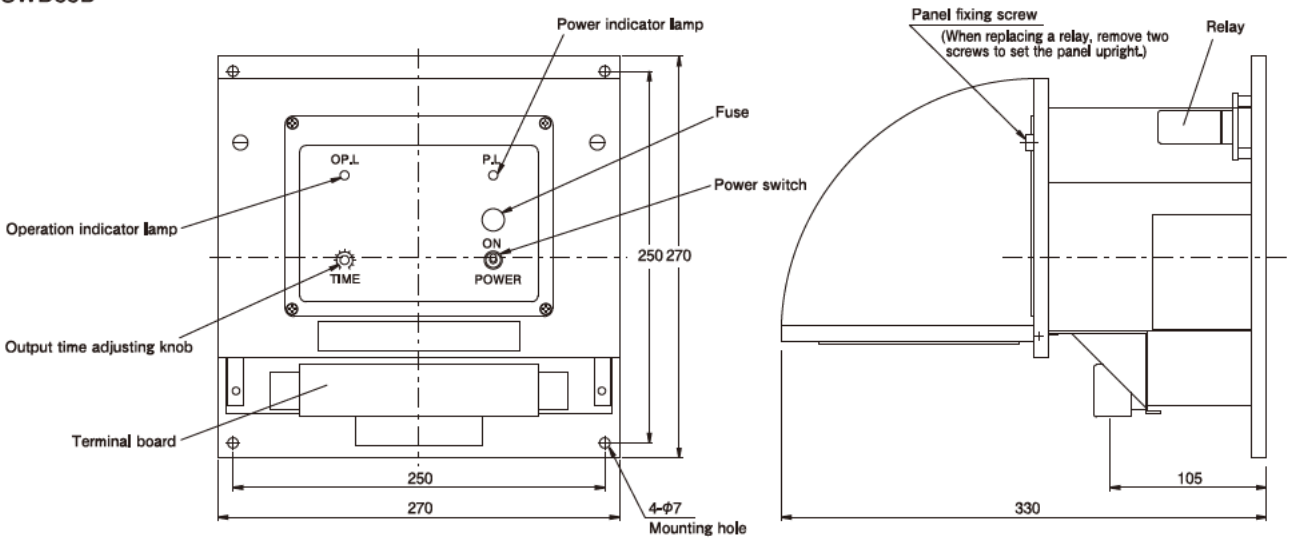
Coating color : Munsell 7.5BG 6/1.5

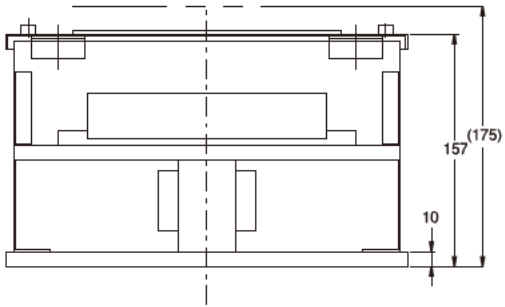
※2 Opening :
This dimension is required for light detection and optical axis adjustment.
When installation base, protecting plate or the like is to be mounted, be sure not to shield this area.

※3 Optical axis adjusting operation indicator lamp×2 :
If these right and left indicator lamps light, it indicates that optical axis adjustment is completed. (These lamps do not light during punched hole detection.)

※4 Operation indicator lamp :
This lamp is located on the side opposite to the lens (rear side) ; it lights during punched hole detection.

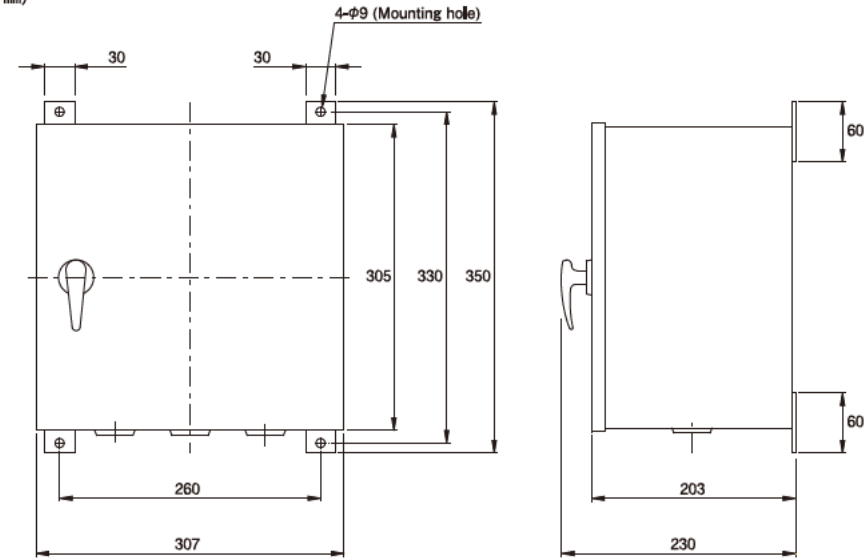
CONTROLLER (in mm)
SWD55B

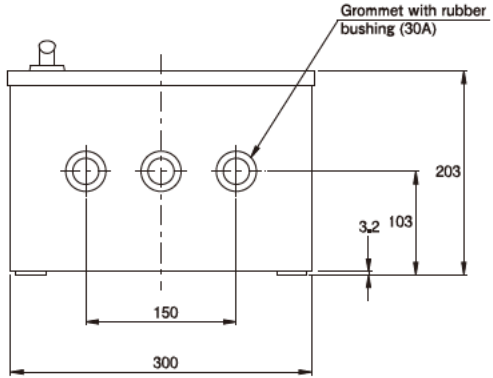




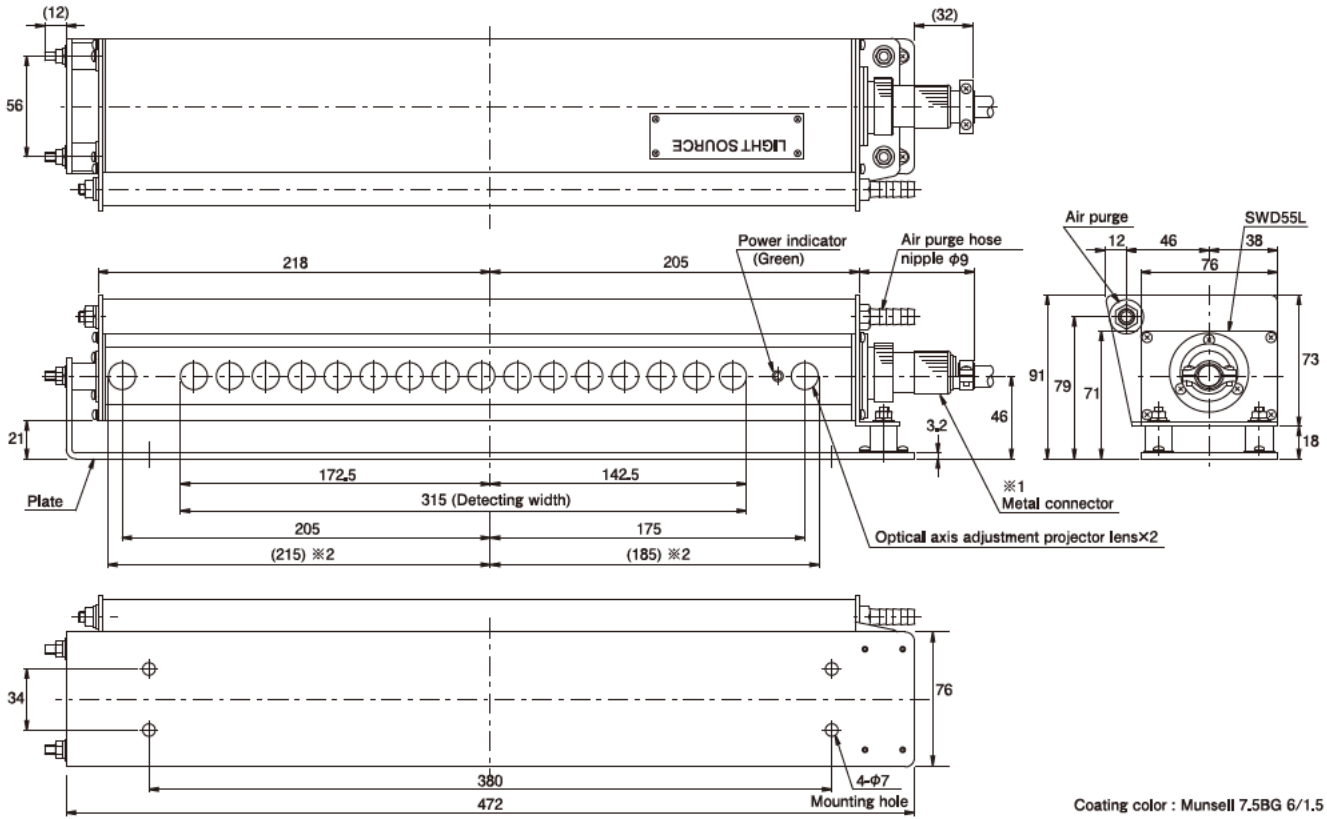
Coating color : Munsell 7.5BG 6/1.5

CONTROL BOX (in mm)





LIGHT SOURCE (WITH AIR PURGE) (in mm)



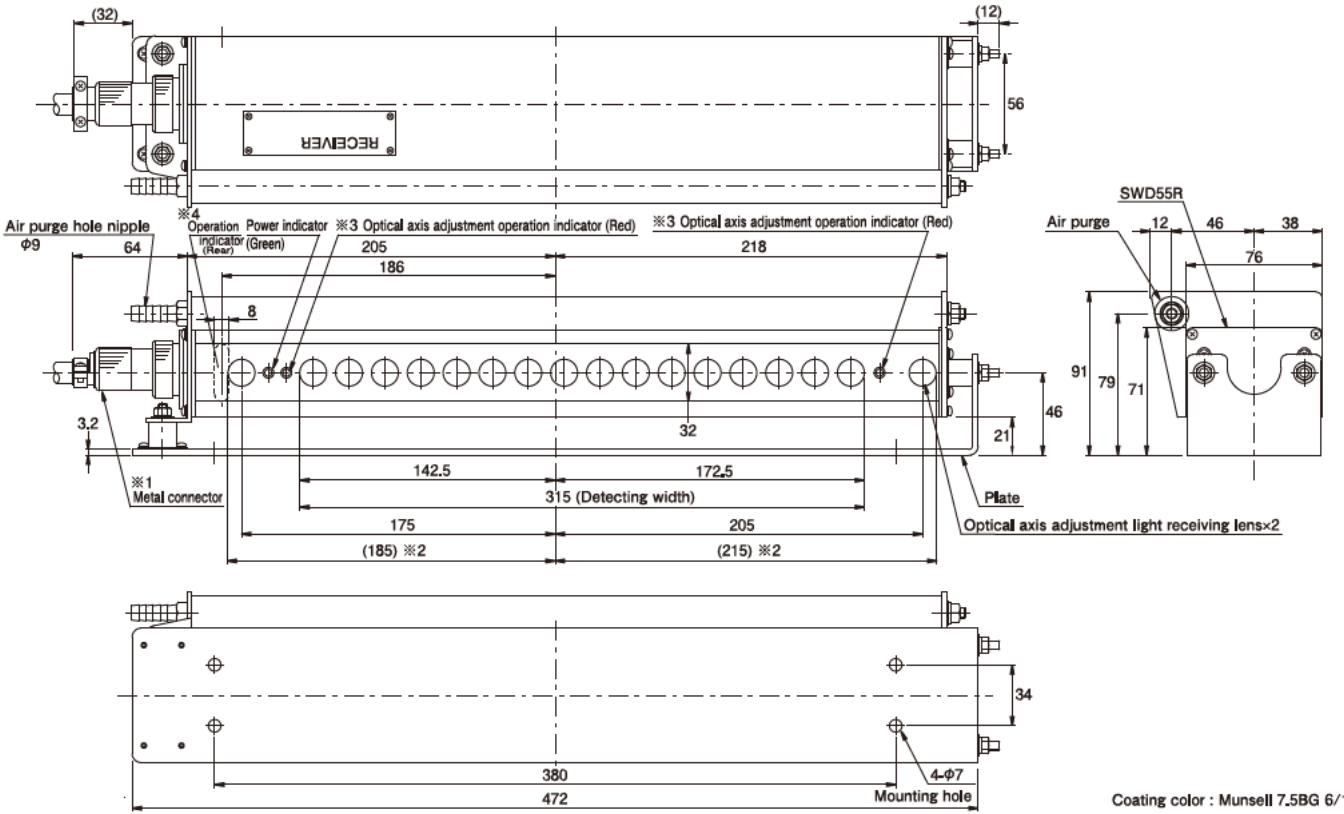
Coating color : Munsell 7.5BG 6/1.5

※1 Metal connector :
Applicable cable : 2㎟×2–core shielded cable, Cable outside diameter : φ10.1 to φ12

※2 Opening :
This opening is required for light detection and optical axis adjustment.
When installation base, protecting plate or the like is to be mounted, be sure not to shield this area.

※3 Air purge
Air volume : approx. 200ℓ/min., Withstand pressure : 0.3MPa

RECEIVER (WITH AIR PURGE) (in mm)



Coating color : Munsell 7.5BG 6/1.5

※1 Metal connector : Applicable cable : 2㎟×3-core shielded cable, Cable outside diameter : Φ10.1 to Φ12

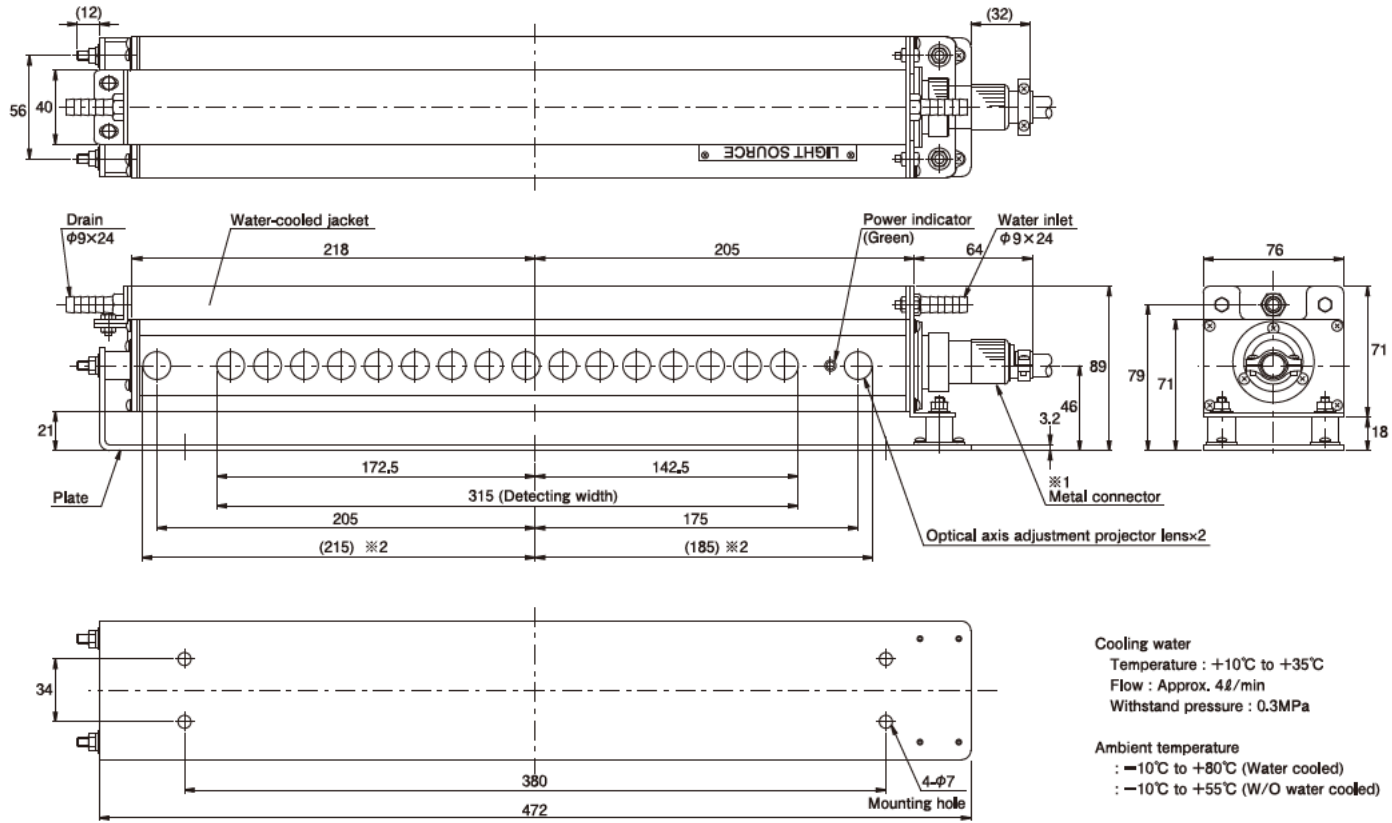
※2 Opening : This opening is required for light detection and optical axis adjustment.
When installation base, protecting plate or the like is to be mounted, be sure not to shield this area.

※3 Optical axis adjusting operation indicator lamp×2 :
When these right and left indicator lamps light, it indicates that the optical axis adjustment is completed.

※4 Operation indicator lamp : This lamp is located at the rear, that is, opposite to the lens surface; it lights when light enters. There are 18 lamps in all : one for each of the 16 channels and two optical axis adjusting operation indicator lamps.

※5 Air purge : Air volume : approx. 200ℓ/min., Withstand pressure : 0.3MPa

LIGHT SOURCE WITH WATER-COOLED JACKET (in mm)



Cooling water
Temperature : +10℃ to +35℃
Flow : Approx. 4ℓ/min
Withstand pressure : 0.3MPa

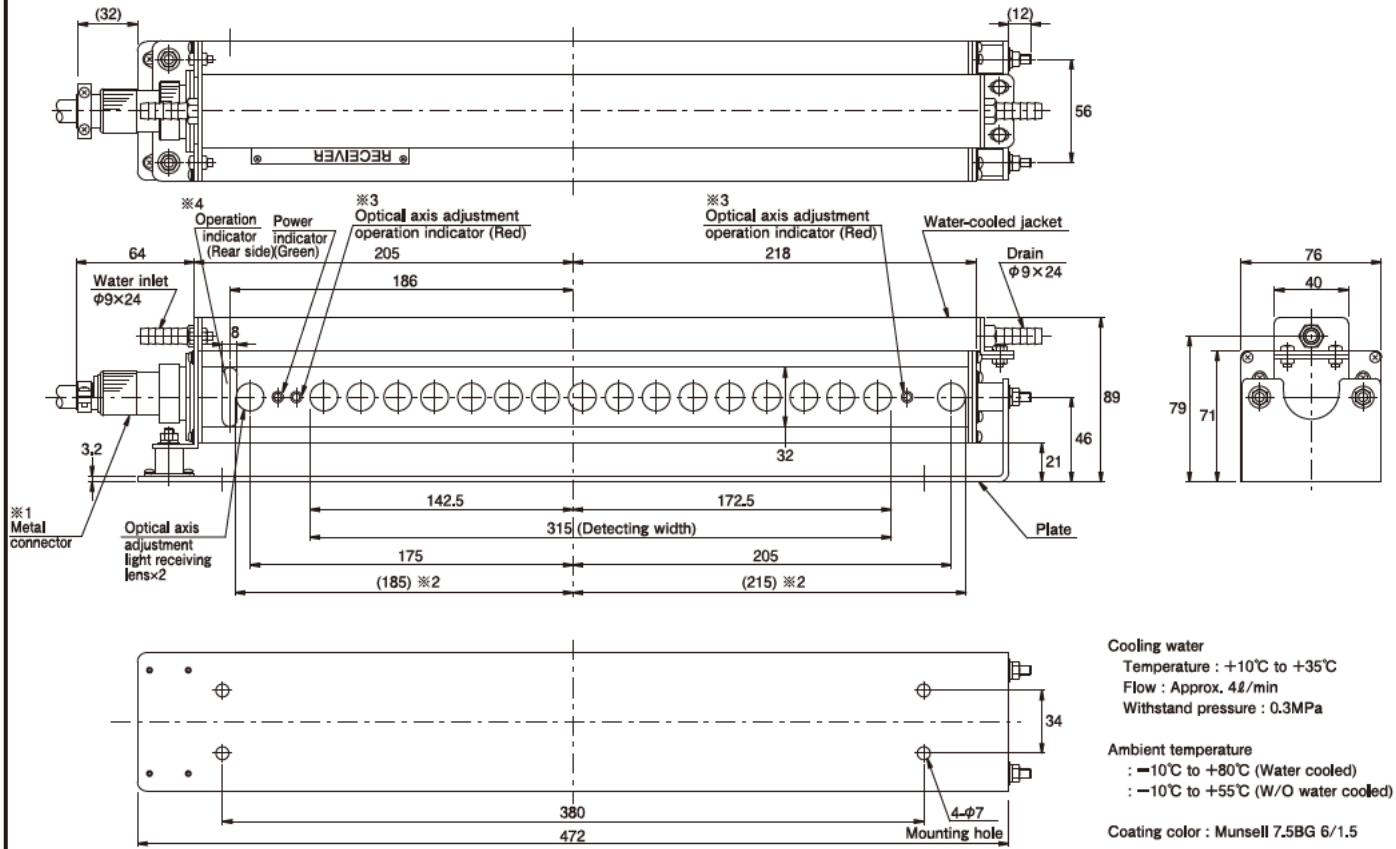
Ambient temperature
: −10℃ to +80℃ (Water cooled)
: −10℃ to +55℃ (W/O water cooled)

Coating color : Munsell 7.5BG 6/1.5

※1 Metal connector (Cable is not attached) :
Applicable cable : 2㎟×2–core shielded cable Cable outside diameter : φ10.1 to φ12

※2 Opening :
This opening is required for light detection and optical axis adjustment.
When installation base, protecting plate or the like is to be mounted, be sure not to shield this area.

RECEIVER WITH WATER-COOLED JACKET (in mm)



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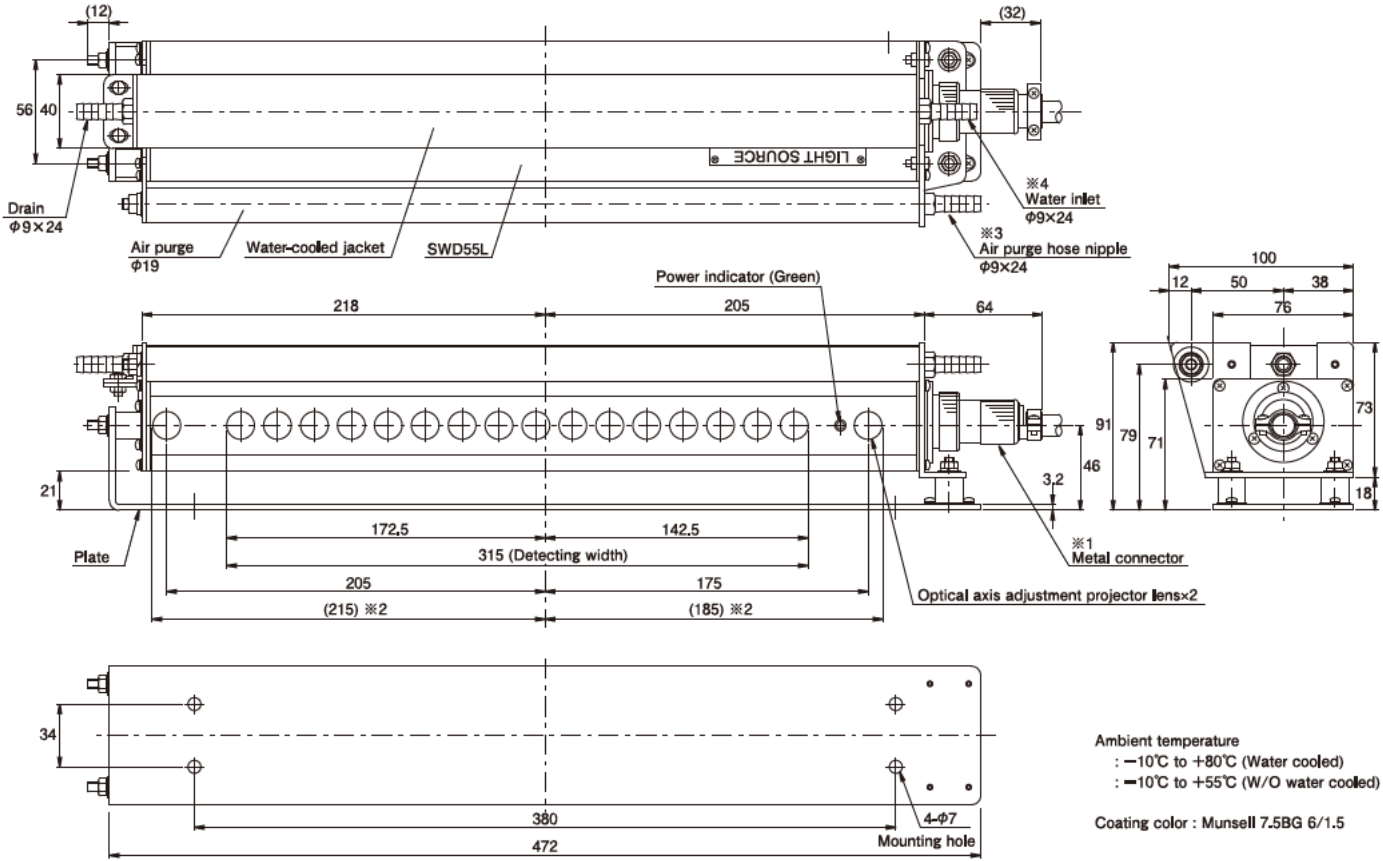
※3 Optical axis adjusting operation indicator lamp×2 :
If these right and left indicator lamps light, it indicates that optical axis adjustment is completed.
(These lamps do not light during punched hole detection.)

※4 Operation indicator lamp :
This lamp is located on the side opposite to the lens (rear side) ; it lights during punched hole detection.

LIGHT SOURCE WITH AIR PURGE AND WATER-COOLED JACKET (in mm)



Ambient temperature
: −10℃ to +80℃ (Water cooled)
: −10℃ to +55℃ (W/O water cooled)

Coating color : Munsell 7.5BG 6/1.5

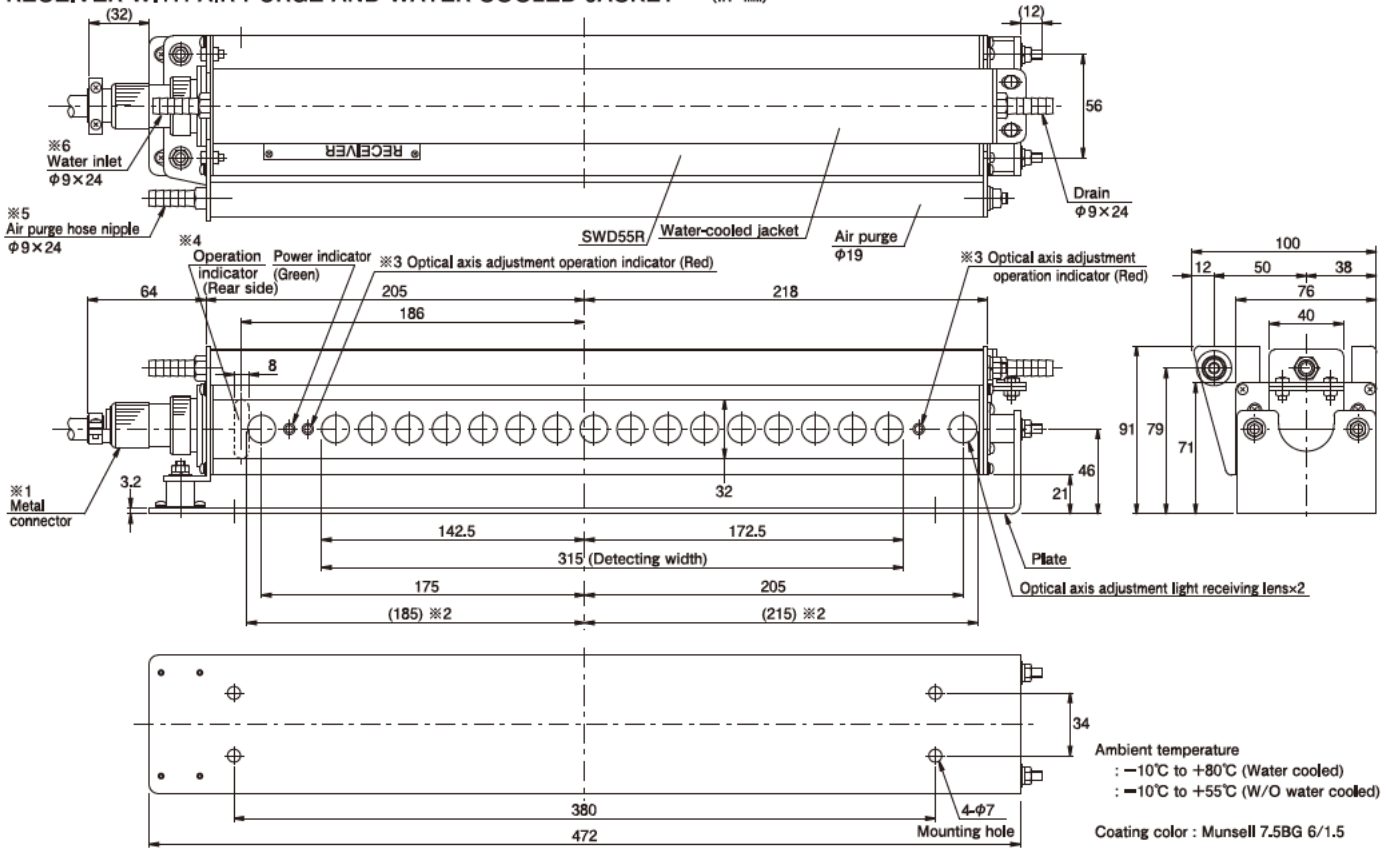
※1 Metal connector (Cable is not attached) :
Applicable cable : 2㎟×2–core shielded cable Cable outside diameter : Φ10.1 to Φ12

※2 Opening :
This opening is required for light detection and optical axis adjustment.
When installation base, protecting plate or the like is to be mounted, be sure not to shield this area.

※3 Air purge Flow : Approx. 20ℓ/min
Withstand pressure : 0.3MPa

※4 Cooling water Temperature : +10℃ to +35℃
Flow : Approx. 4ℓ/min
Withstand pressure : 0.3MPa

RECEIVER WITH AIR PURGE AND WATER-COOLED JACKET (in mm)



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※4 Operation indicator lamp :
This lamp is located on the side opposite to the lens (rear side) ;
it lights during punched hole detection.

※5 Air purge Flow : Approx. 200ℓ/min
Withstand pressure : 0.3MPa

※6 Cooling water Temperature : +10℃ to +35℃
Flow : Approx. 4ℓ/min
Withstand pressure : 0.3MPa

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