Customized HP100 Sensors

HP300 Series

Customized to solve difficult application problems

HP300 Series sensors are customized to users' needs,
for problems too tough or unusual for the **HP100 Series**.
Developed to meet your application needs,
using Yamatake's solutions expertise.

Contact Yamatake Corporation in case of applications where the HP100 Series cannot be used.

The HP300 Series:

Yamatake delivers solutions by developing customized products for particular work site issues, based on the HP100 Series of general-purpose self-contained photoelectric sensors.

Are you faced with any of these problems?

- **Tightly mounted thru-scan sensors interfere with each other, and a filter doesn't help.**
- **An advance operation check is needed to prevent error due to dust or dirt.**
- **Chattering may occur during detection, depending on the target object condition.**
- **A diffuse-scan model sometimes fails to detect a target object that has a hole or notch.**
- **A diffuse-scan sensor is needed but is unreliable if the scanning distance is too short.**
- **The use of both NPN and PNP models requires too much troublesome maintenance.**
- **Seasonal fogging of the lens surface causes operational error.**
- **Cables become disconnected from sensors mounted on moving units.**

The HP300 Series can solve your application problems!

Yamatake's HP300 Series engineers listen to users' issues and discuss possible customized product solutions.

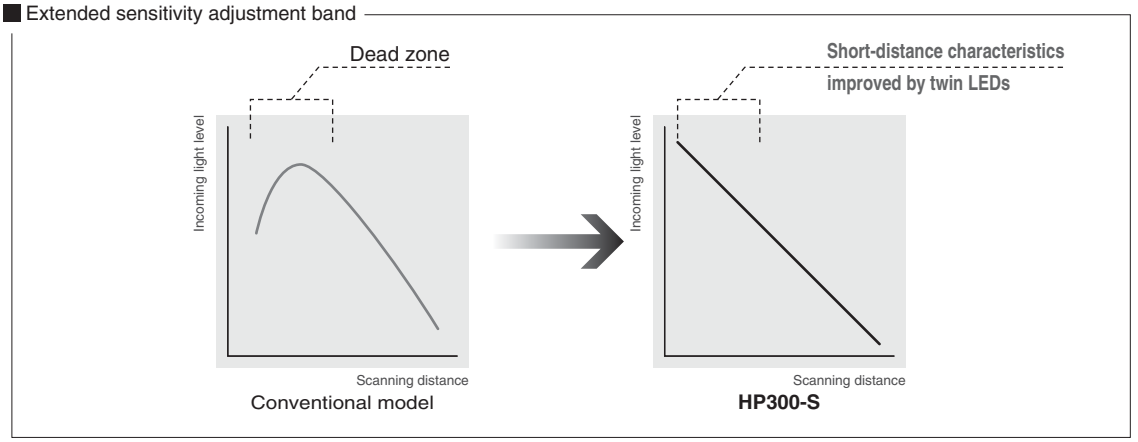
Models listed below are now available.

Type	Catalog listings	Description
Short-range diffuse-scan	HP300-S1	NPN, Preleaded2m
	HP300-S2	PNP, Preleaded2m
Remote emitter control thru-scan	HP300-T1-003	NPN, Preleaded2m
Wide-beam diffuse-scan	HP300-D1	NPN, Preleaded2m
	HP300-D2	PNP, Preleaded2m
NPN/PNP dual output model	HP300-□3-CN03	Preleaded connector30cm

Short-range diffuse-scan type HP300-S1 / HP300-S2

■ Twin emitter-LEDs and an extended sensitivity adjustment band enable reliable detection in the short-distance range

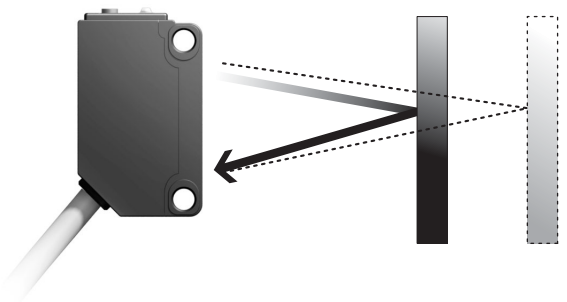
■ Extended sensitivity adjustment band



■ Mutual interference prevention allows dense same-line mounting of multiple sensors

■ APPLICATIONS

● Position detection based on the difference in scanning distances



Even at short distances the difference in light level is sufficient to differentiate the positions.

● Reliable detection of low-reflectance targets

HP300-S

Thanks to improved characteristics, incoming light level is high at short distances. By setting a short scanning distance, low-reflectance targets can be detected.

CATALOG LISTING

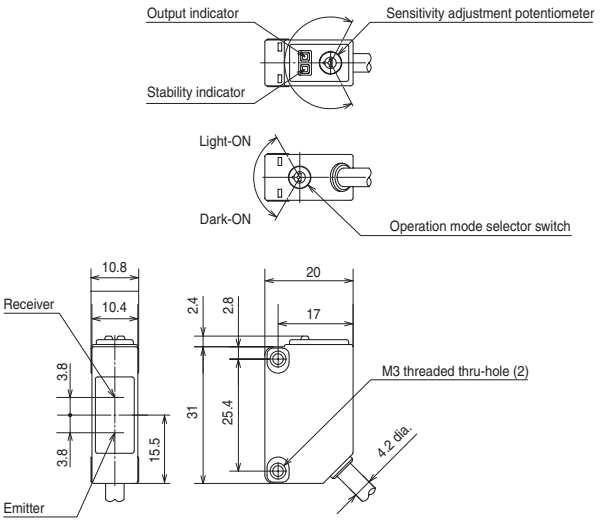
Catalog listing	Description
HP300-S1	NPN, preleaded, cable length 2m
HP300-S2	PNP, preleaded, cable length 2m

SPECIFICATIONS

Catalog listing	HP300-S1	HP300-S2
Detection type	Short-distance diffuse-scan	
Power supply	10 to 30Vdc (ripple 10% max.)	
Current consumption	11mA	
Scanning distance	200mm	
Sensitivity adjustment method	1-turn potentiometer	
Operation mode	Light-ON / dark-ON selectable by switch	
Output type	NPN open collector	PNP open collector
Control output	Switching current: 100mA max. (resistive load). Output dielectric strength: 30V. Voltage drop: 3V max. (at 100mA switching current). Short circuit protection.	
Response time	500μs max. for both operation and recovery	
Emitter LED	Infrared LED	
Indicator	Output indicator: orange at control output ON. Stability indicator: green at stable light/dark status	
Ambient light immunity	Incandescent lamp: 10,000 lux max. Sunlight: 40,000 lux max.	
Operating temperature	–30 to +60°C (no freezing or condensing)	
Operating humidity	30 to 85% RH (no freezing or condensing)	
Storage temperature	–40 to +70°C(no freezing or condensing)	
Protective structure	IP67 (IEC)	
Wiring type	Preleaded, cable length 2m	
Weight	Approx. 55g (body with 2m cable only)	
Circuit protection	Power ON malfunction prevention (approx. 8ms delay), wiring error protection	

EXTERNAL DIMENSIONS

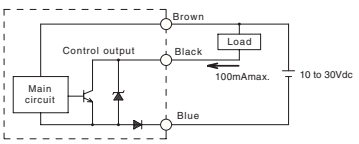
(unit: mm)



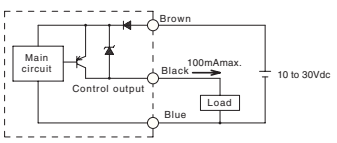
OUTPUT CIRCUIT DIAGRAM

(Note that a FET is used for output)

HP300-S1



HP300-S2



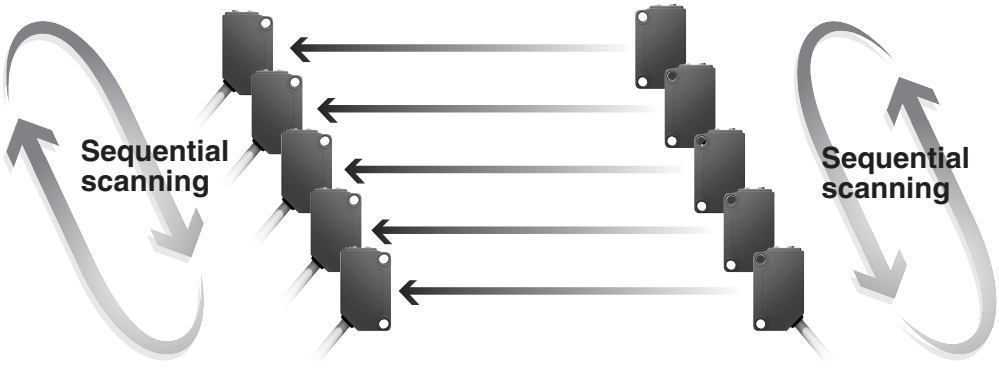
Remote emitter control thru-scan type HP300-T1-003

- Long scanning distance of 15m
- Emitter-LED ON/OFF control by remote input
- Status indicator in front enables light axis alignment by only one operator

APPLICATIONS

● Multiple sensors in a dense single line without mutual interference

Mutual interference is a problem when thru-scan sensors are mounted close together. But if each emitter is turned on in succession (using emitter control input), and its output checked, mutual interference is prevented–and there is no limit on the number of units.



● Sensor diagnosis by remote input

Sensor failure (due to dust, dirt, light axis displacement, etc.) can be discovered at startup by switching emit-ters ON/OFF using emitter control input.

● Wireless interlock signal transmission

Send a permission signal from one piece of equipment to another, or a start/stop instruction to an automatic guided vehicle using a long-distance 1-bit wireless signal.

CATALOG LISTING

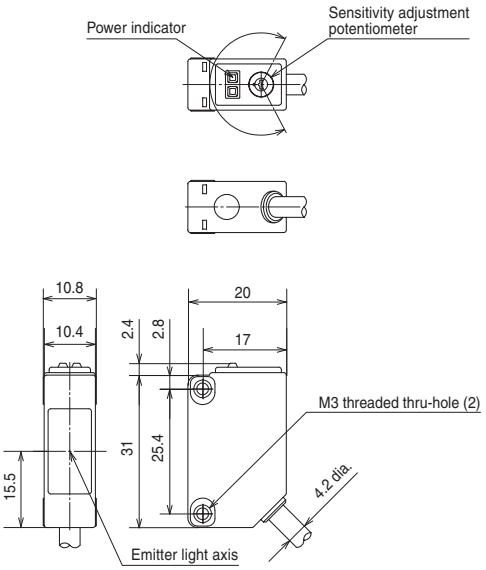
Catalog listing	Description
HP300-T1-003	NPN, preleaded, cable length 2m

SPECIFICATIONS

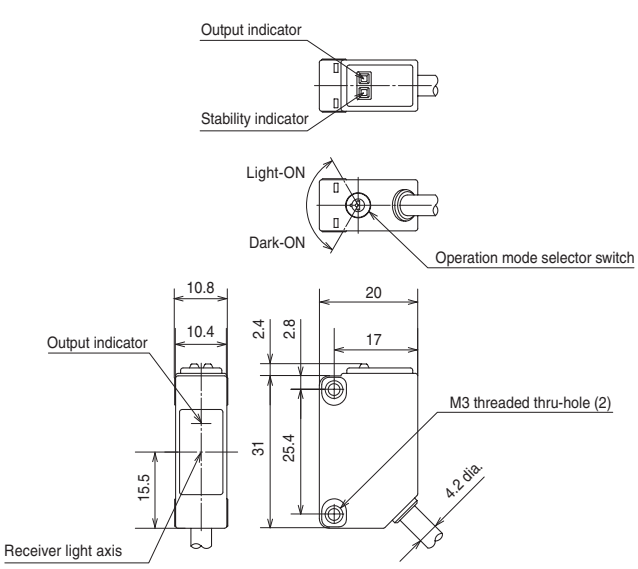
Catalog listing	HP300-T1-003
Detection type	Thru-scan
Power supply	10 to 30Vdc (ripple 10% max.)
Current consumption	Emitter: 16mA. Receiver: 11mA.
Scanning distance	15m
Sensitivity adjustment method	1-turn potentiometer
Operation mode	Light-ON / dark-ON selectable by switch
Output type	NPN open collector
Control output	Switching current: 100mA max. (resistive load). Output dielectric strength: 30V. Voltage drop: 3V max. (at 100mA switching current). Short circuit protection.
Emitter control input	Emitter control input: emission OFF at 0V, normal emission with open connection
Response time	500µs max. for both operation and recovery
Emitter LED	Red LED
Indicator	Receiver : Orange at power ON, green at stable light-ON and light-OFF, and red for front incoming light indicator Emitter : Orange at power ON and go emission
Ambient light immunity	Incandescent lamp: 10,000 lux max. Sunlight: 40,000 lux max.
Operating temperature	–30 to +60°C (no freezing or condensing)
Operating humidity	30 to 85% RH (no freezing or condensing)
Storage temperature	–40 to +70°C (no freezing or condensing)
Protective structure	IP67 (IEC)
Wiring type	Preleaded, cable length 2m
Weight	Approx. 55g
Circuit protection	Power ON malfunction prevention (approx. 8ms delay), wiring error protection

EXTERNAL DIMENSIONS (unit: mm)

Emitter

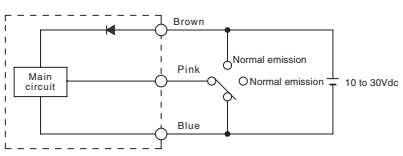


Receiver

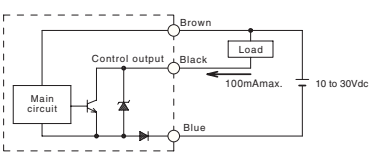


OUTPUT CIRCUIT DIAGRAM (Note that a FET is used for output)

Emitter



Receiver

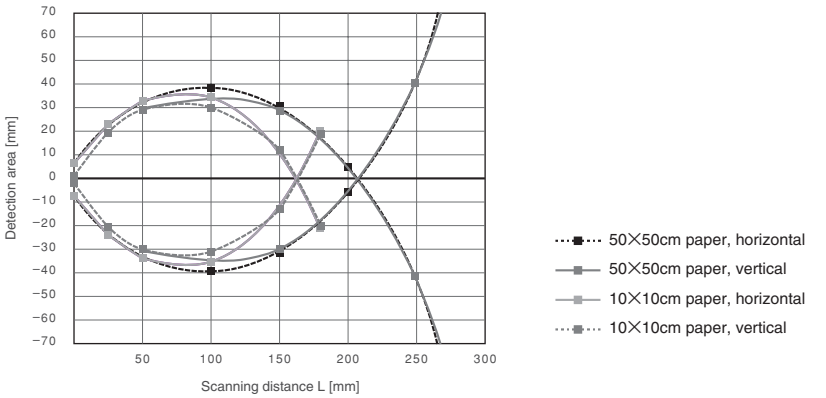


Wide-beam diffuse-scan type HP300-D1／HP300-D2

■ Targets of various shapes can be reliably detected with a beam that is 7 times as wide as a regular diffuse-scan beam.

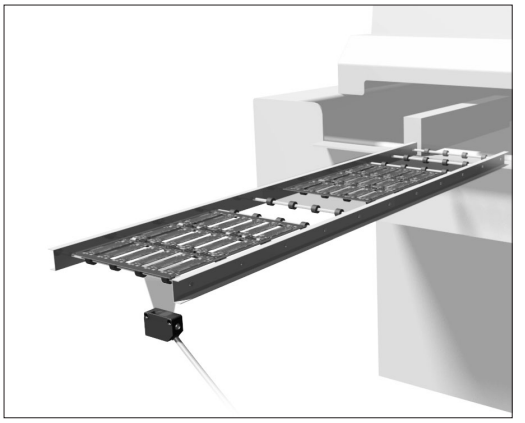
■ High sensitivity makes low-reflectance targets detectable.

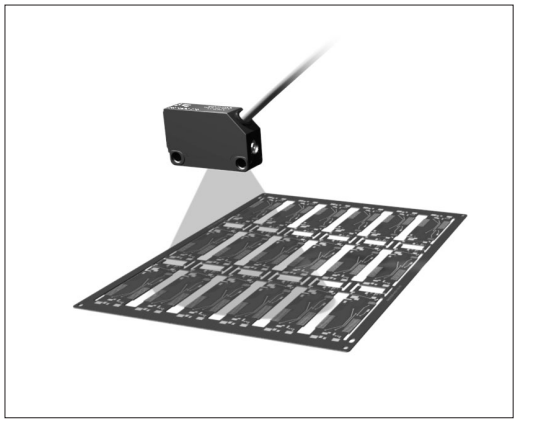
Detection area characteristics (Targets: 50×50cm, 10×10cm white paper)



■ APPLICATIONS

● Detecting notched or perforated PWBs





CATALOG LISTING

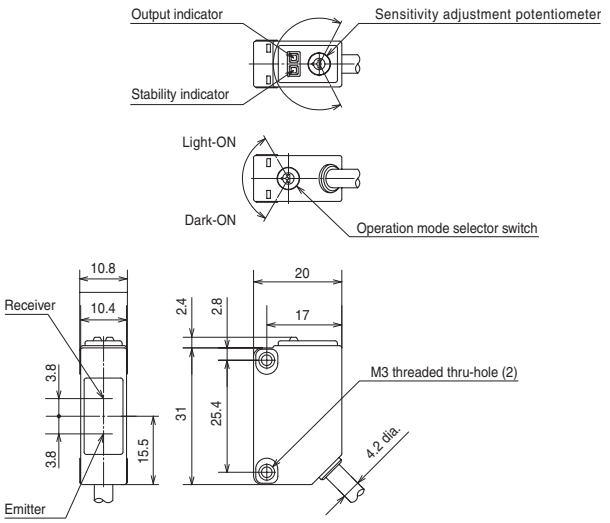
Catalog listing	Description
HP300-D1	NPN, preleaded, cable length 2m
HP300-D2	PNP, preleaded, cable length 2m

SPECIFICATIONS

Catalog listing	HP300-D1	HP300-D2
Detection type	Wide-beam diffuse-scan	
Power supply	10 to 30Vdc (ripple 10% max.)	
Current consumption	16mA	
Scanning distance	0 to 100mm	
Sensitivity adjustment method	1-turn potentiometer	
Operation mode	Light-ON / dark-ON selectable by switch	
Output type	NPN open collector	PNP open collector
Control output	Switching current: 100mA max. (resistive load). Output dielectric strength: 30V. Voltage drop: 3V max. (at 100mA switching current). Short circuit protection.	
Response time	500µs max. for both operation and recovery	
Emitter LED	Infrared LED	
Indicator	Output indicator: orange at control output ON. Stability indicator: green at stable light/dark status.	
Ambient light immunity	Incandescent lamp: 10,000 lux max. Sunlight: 40,000 lux max.	
Operating temperature	–30 to +60˚C (no freezing or condensing)	
Operating humidity	30 to 85% RH (no freezing or condensing)	
Storage temperature	–40 to +70˚C (no freezing or condensing)	
Protective structure	IP67 (IEC)	
Wiring type	Preleaded, cable length 2m	
Weight	Approx. 55g (body with 2m cable only)	
Circuit protection	Power ON malfunction prevention (approx. 8ms delay), wiring error protection	

EXTERNAL DIMENSIONS

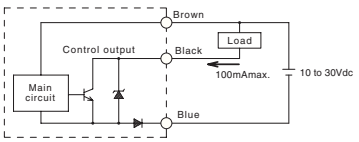
(unit: mm)



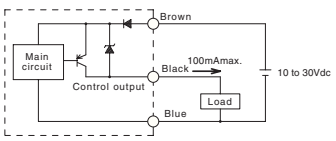
OUTPUT CIRCUIT DIAGRAM

(Note that a FET is used for output)

HP300-D1



HP300-D2

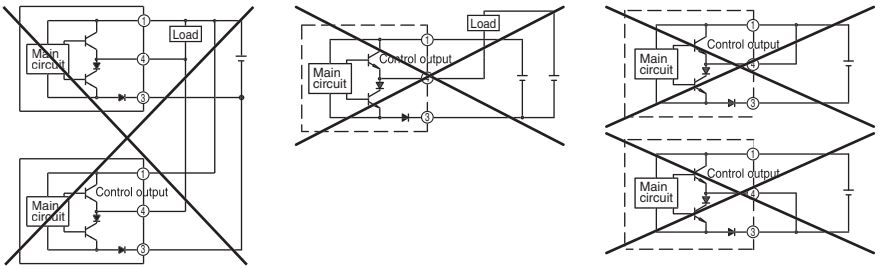


NPN-PNP dual output type HP300-□3-CN03

HP300-T3-CN3 (thru-scan) / HP300-P3-CN03 (polarized retroreflective) / HP300-A3-CN03 (diffuse-scan)

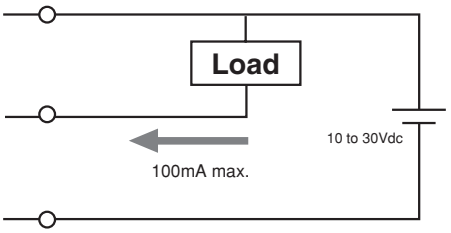
- Can be connected to 2 input circuits, 1 with NPN output and 1 with PNP output
- Output type is changeable without changing wiring, since output line is common, unlike individual output models

Notes:
- Since this sensor may be damaged if its output is connected to output from another sensor, do not use the output in an OR circuit.
- Be sure that the supply power for this sensor is the same as for the load. The sensor may be damaged if different power is applied. For details, refer to the specifications.
- Since this sensor does not have an output short-circuit protection circuit, short-circuiting of the output may damage the output transistor or shorten the sensor's life.



APPLICATIONS

Used as NPN output type



Relation between output selector switch and output

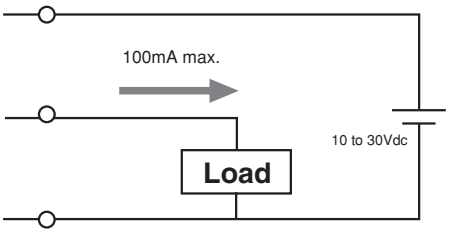
Output selector switch set to LO

Light received	Output ON
Light blocked	Output OFF

Output selector switch set to DO

Light received	Output OFF
Light blocked	Output ON

Used as PNP output type



Relation between output selector switch and output

Output selector switch set to LO

Light received	Output OFF
Light blocked	Output ON

Output selector switch set to DO

Light received	Output ON
Light blocked	Output OFF

CATALOG LISTING

Catalog listing	Description
HP300-T3-CN03	NPN-PNP dual output, thru-scan, preleaded connector, cable length 30cm
HP300-P3-CN03	NPN-PNP dual output, polarized retroreflective, preleaded connector, cable length 30cm
HP300-A3-CN03	NPN-PNP dual output, diffuse-scan, preleaded connector, cable length 30cm

SPECIFICATIONS

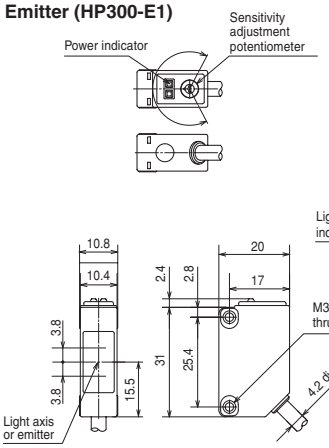
Catalog listing	HP300-T3-CN03	HP300-P3-CN03	HP300-A3-CN03
Detection type	Thru-scan	Polarized retroreflective	Diffuse-scan
Power	10 to 26.4Vdc (ripple 10% max.)		
Current consumption	**HP300-E1**: 16mA max. **HP300-R3**: 18mA max.	20mA max.	23mA max.
Scanning distance	15m	0.05 to 5m (when used with **FE-RR8** or **FE-RR17** reflector)	1m
Sensitivity adjustment method	1-turn potentiometer		
Operation mode	Selectable by output selector switch (see applications on front page)		
Output type	NPN-PNP dual output		
Control output	Switching current: 30mA (resistive load) Output voltage: 26.4V Voltage drop: 3V max. (at 30mA switching current)		
Response time	500µs max. for both operation and recovery		
Emitter LED	Red LED		Infrared LED
Indicator	Other than thru-scan emitter: orange at power ON, green at stable light/dark status Thru-scan emitter: orange Thru-scan receiver: red for front incoming light indicator		
Ambient light immunity	Incandescent lamp: 10,000 lux max. Sunlight: 40,000 lux max.		
Operating temperature	–10 to +50˚C (no freezing or condensing)		
Operating humidity	35 to 85% RH (no freezing or condensing)		
Storage temperature	–40 to +70˚C (no freezing or condensing)		
Protective structure	IP67 (IEC)		
Wiring type	Preleaded, cable length 30cm		
Mass	Approx. 55g (body only)		
Circuit protection	Power ON malfunction prevention (output is fixed at high level for approx. 8ms), wiring error protection (without short-circuit protection)		

EXTERNAL DIMENSIONS

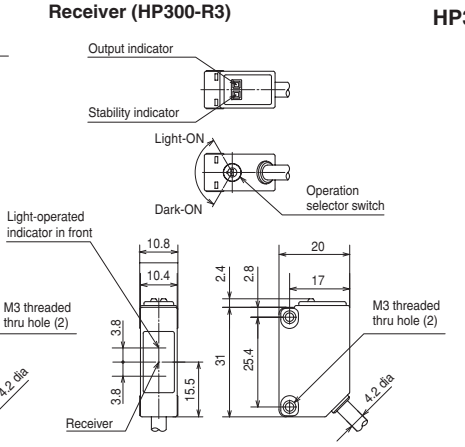
(unit: mm)

HP300-T3-CN03 Thru-scan

Emitter (HP300-E1)

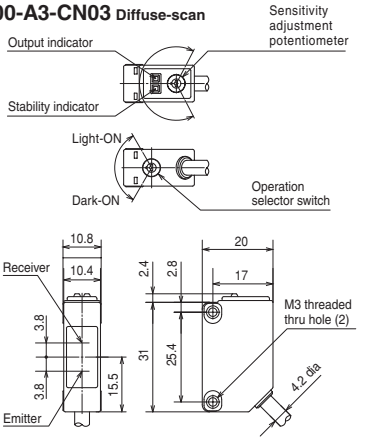


Receiver (HP300-R3)

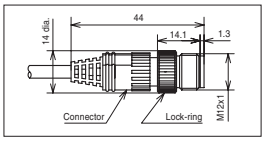


HP300-P3-CN03 Polarized retroreflective

HP300-A3-CN03 Diffuse-scan

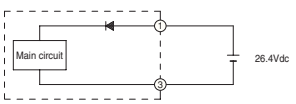


●Connector (common)



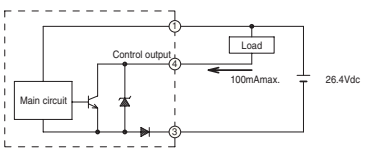
OUTPUT CIRCUIT DIAGRAM (Note that a FET is used for output)

● **HP300-T3** Emitter (**HP300-E1**)



● **HP300-T3** Receiver (**HP300-R3**), **HP300-P3-CN03** (polarized retroreflective), **HP300-A3-CN03** (diffuse-scan)

Used as NPN output



Used as PNP output