Date: 2024.10.2

YHT-05LA

SPECIFICATIONS

Symbol	Amended Reason			Pages	Date	Corrector	Amendment No.

Approved by	Checked by	Drawn by	Designed by	Title	YHT-05LA Specifications	
HINO	UTSUGI	YAMAGUCHI	YAMAGUCHI	Drawing No.	C-42-04574	1/11

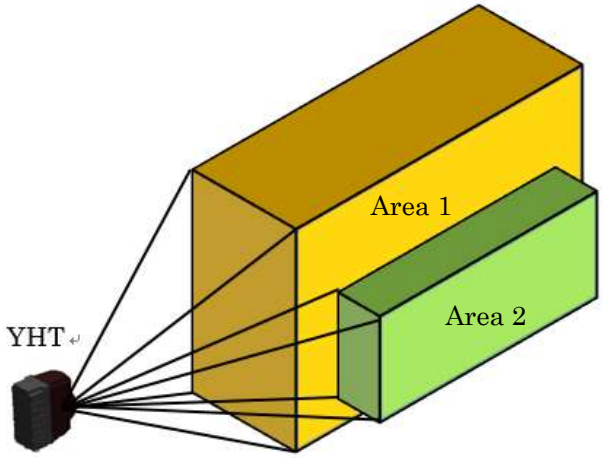
1. General

1.1 Operation principle

YHT scans a field of +40°-45° vertically × 45° horizontally using a laser beam (λ = 905 nm), determines whether there are any obstacles within the specified installation area, and outputs the information. Small obstacles can be detected by performing interlace operation. Areas can be set in advance using a PC application. Distance, angle data, etc. can be obtained through communication.
This product is class 1 laser product.

1.2 Area

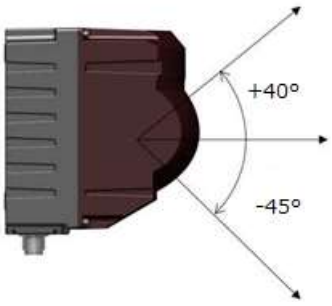
Two detection areas can be monitored simultaneously. In addition, the area can be switched between 3 patterns using the input signal.



2. Structure

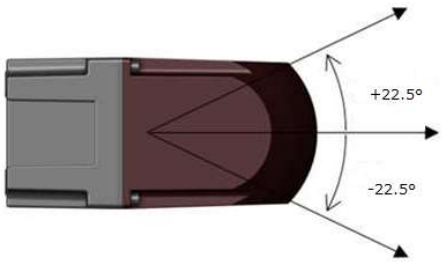
2.1 Scanning range

Vertical scanning range



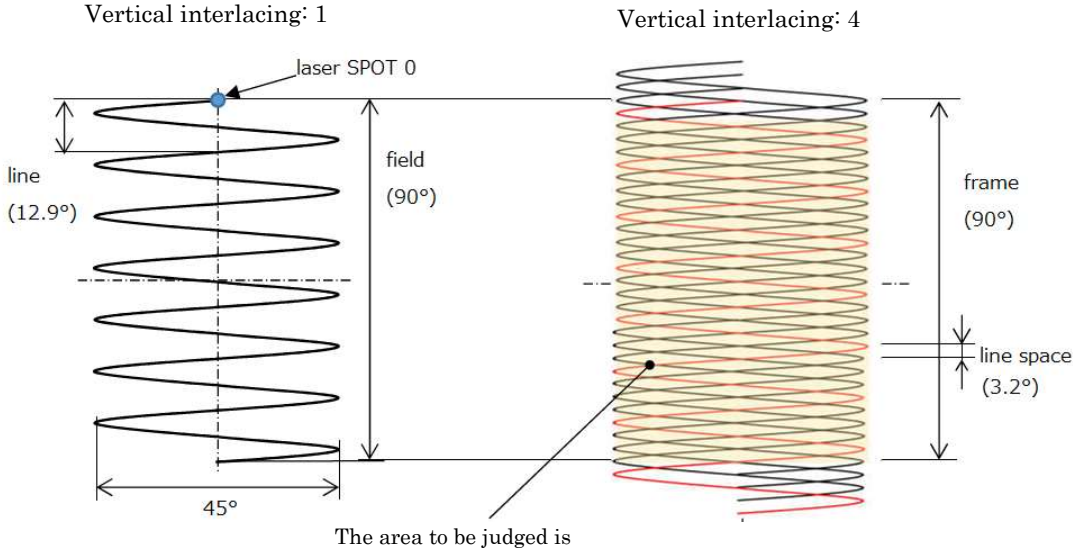
Scanning direction

Horizontal scanning range



2.2 Scanning

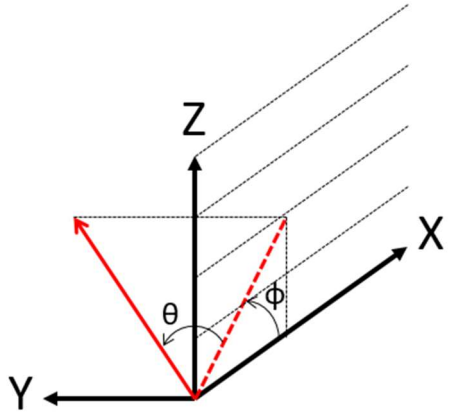
This product uses a motor to scan vertically and a ReM (resonant mirror) to scan horizontally. A scan consists of lines, fields, and frames. One line is 12.9 degrees per cycle, and one field is 90 degrees (7 lines). One frame changes depending on interlace. With interlace settings of 1 or higher, scanning is expanded to 8 lines. Vertical interlace setting: 4 provides 4x higher vertical resolution. When data is acquired via communication, data outside the scan angle range will also be output.



1Frame	MAX 128Field
1Field	7Line
1Line	All 186spot – OFF 28spot
OFF spot No.37,39,41,43,44,45,46,48,49,50,51,53,55,57,	
130,132,134,136,137,138,139,141,142,143,144,146,148,150	

2.2.1 Conversion to orthogonal coordinates

Determine the horizontal angle θ by horizontally scanning the laser with the mirror. The vertical angle of the motor is determined from there. It can be expressed in orthogonal coordinates as shown in the figure below.



3. Disclaimer
   (1) This sensor is not certified for the functional safety.
   (2) This sensor cannot be used for human body detection as per the machinery directives.
   (3) When there is a risk that this sensor is intended for use in mass-destruction weapons, weapons and equipment aimed at killing human beings, and relevant technologies, or when uses for such purposes are clear, sales may be prohibited in accordance with the Foreign Exchange and Foreign Trade Act, and the Export Trade Control Order (Japanese law). Moreover, regarding export of products, the formalities according to laws/Export Trade Control Order are implemented in order to maintain international peace and safety.
   (4) Sensor emits laser for measurement. Sensor's operation may become unstable under the influence of strong light interference or when emitted lights are not reflected back from the object.
   (5) Sensor's operation may become unstable due to rain, snow and fog or due to dust pollution on the optical window.
   (6) Rules and regulations related to safety should be strictly followed by the user when operating the sensor.
   (7) Before using the sensor, make sure to read this specification thoroughly.

4. Specifications

Supply voltage	24V ± 10%
Current consumption	5W *3
Light source	Semiconductor laser, λ = 905 nm
Laser safety class	Class 1
Average accuracy by distance	200mm to 5000mm ±40mm *1
Mean error	σ ＜20 *1
Detection range and object	Guaranteed value of detection: 200 to 5000mm(Reflectance of 90% 500mm×500mm) *1 300 to 3000mm(Reflectance of 10% 500mm×500mm) *1 Horizontal -10°to -22.5°, Vertical -15° to -45°: 500mm to 2500mm (Reflectance of 10%) Maximum detecting distance: 10m (maximum value of area setting)
Scanning angle	Horizontal direction: 45° Vertical direction: +40° -45°
Scanning time	17.5ms (varies depending on ReM cycle)
Measurement resolution	1mm
Angular resolution	Vertical direction: 12.9°(interlace setting 16: 0.8°, 32: 0.4°) Horizontal direction: 0.3 to 0.75°(interlace setting 2: 0.15 to 0.375°)
Starting time	Within 60 sec
Output	OUTPUT 5 points: (Photocoupler, Open collector output DC30V 50mA Maximum residual voltage 2V or less) Area1 detection: Output is OFF when detected within area Area2 detection: Output is OFF when detected within area Ready: Output is ON when detection/judgment is possible. Maintenance: Output is OFF due to maintenance request. Malfunction: Output is OFF in failure condition.
Input	INPUT 2 points (Photocoupler input, Common anode, Input ON current 4 mA) Area pattern switching 1: INPUT for detection area pattern switching Area pattern switching 2: INPUT for detection area pattern switching
Response time	Response time varies depending on the size of the object to be detected and filter settings. Vertical interlace settings 16: 280ms 32: 560ms

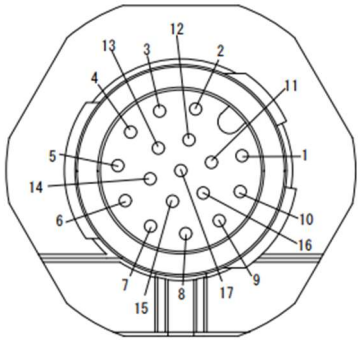
Interface	Ethernet 100BASE-TX
Indication lamp	None
Connection method	Power supply, IO: Connector, Communication: connecter
Ambient operating temperature, humidity	-10℃ to +50℃ 85%RH or less (However, dew condensation and freezing should not exist.)
Ambient operating illuminance	100,000 lux or less (halogen) *2 * If it is directly exposed to strong light such as sunlight, incorrect output may occur.
Storage ambient temperature, humidity	-10℃ to +60℃ 85%RH or less (However, dew condensation and freezing should not exist.) *Since a motor is used, the grease on the bearings becomes hard after long-term storage at low temperatures. Turn on the power and perform warm-up operation.
Vibration resistance	10 to 55 Hz, plural amplitude: 1.5 mm each 2 hours in X, Y and Z directions
Shock resistance	196m/s² (20G) each 10 times in X, Y and Z directions
Compatible standards	(EMI) EN55011: Class A (EMS) EN61000-4-2: B (level 3) EN61000-4-3: A (level 2) EN61000-4-4: A (level 3)
Protective structure	IP65
Weight	800g
Material	Optical window: Polycarbonate, Main body: Aluminum
External Dimension (W × D × H)	62mm×116.5mm×123mm (Main body only)

*1 Indoor environment (fluorescent lamp, 1,000 lux or less)
*2 Detection cannot be guaranteed when direct light (such as sunlight) enters the device.
*3 Please use a power supply with sufficient current capacity.

5. Connection

5.1 Power supply, I/O

Connector Model: SACC-E-MS-17CON-M16/0,5SCO
Manufacturer: Phoenix Contact
Compatible cable model: SAC-17P-1,5-PVC/FS SCO etc.
* Power supply and I/O cables are not included.

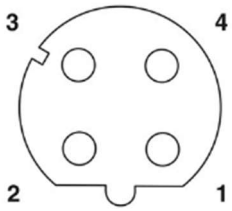


PIN No.	Function	Signal
1	Power supply	+VIN (DC24V)
2	Power supply	-VIN (0V)
3	Output	Area1 detection
4	Output	Area2 detection
5	Output	Ready
6	Output	Maintenance
7	Output	Malfunction
8	NC	–
9	NC	–
10	NC	–
11	NC	–
12	NC	–
13	NC	–
14	Input	Area pattern switching 1
15	Input	Area pattern switching 2
16	IO Power supply	COM+
17	IO Power supply	COM-

Please leave unused input lines OPEN or connect them to COM+.
Please leave unused output lines OPEN or connect them to COM-.
Do not connect to NC as there is internal wiring.

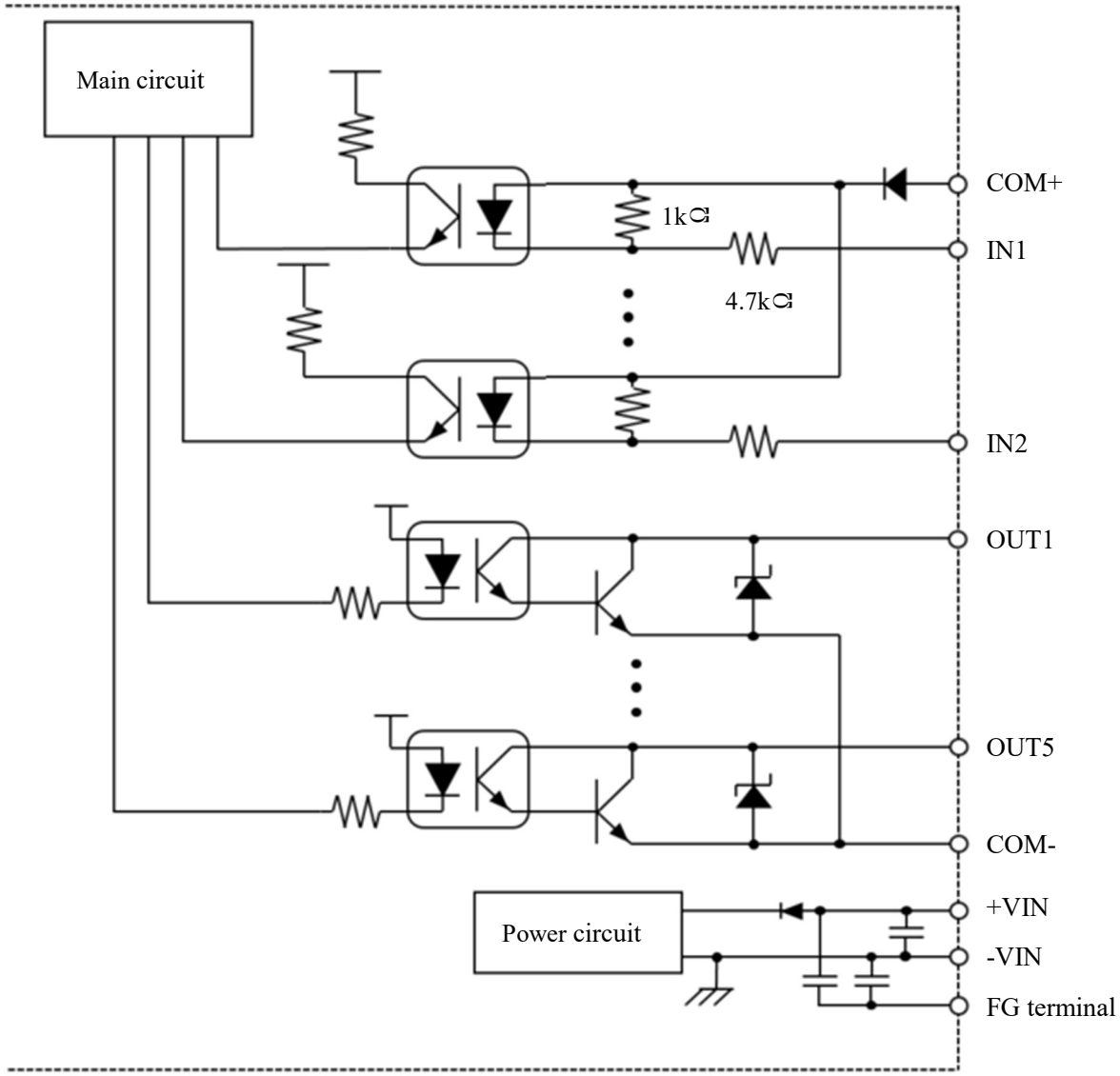
5.2 Ethernet

Connector Model: SACC-E-FSD-4CON-M16/0,5SCO
Manufacturer: Phoenix Contact
Compatible Ethernet cable model: NBC-MSD□,0-93E/R4ACSCO etc.
* Ethernet cables are not included.



PIN No.	Signal
1	RX+
2	TX+
3	RX-
4	TX-

6. Input/output circuit



7. Control signal

7.1 Detection Area 1/2

Set the area in the application and output the presence or absence of obstacles within the area.

7.2 Ready

Outputs when the sensor is performing judgment operation.

7.3 Maintenance

Outputs whether the sensor optical window is dirty. Please set the threshold, delay, output items, etc. in the application.

7.4 Malfunction

Outputs the presence or absence of sensor failure status.

7.5 Area pattern switching 1/2

Switch to a pre-registered area using a combination of two inputs.
There are three types of area patterns that can be set, and selection is made using two inputs.
If both inputs are ON, it will enter sleep mode.
Returning from sleep mode to judgment state takes the same amount of time as the power supply startup time.

Area pattern	Area pattern switching **1**	Area pattern switching **2**
Pattern 1	OFF	OFF
Pattern 2	ON	OFF
Pattern 3	OFF	ON
Sleep mode	ON	ON

8. Sensor status and output list

Sensor status/output	Area detection	Ready	Maintenance	Malfunction
During start up	OFF	OFF	ON	ON
During waiting for measurement (Loading log etc.)	□	OFF	□	ON
Normal time	Detection: OFF No detection: ON	ON	Error detection: OFF Normal time: ON	ON
During Area switching	□	OFF	□	ON
When detecting light dirt	Detection: OFF No detection: ON	ON	OFF	ON
When detecting heavy dirt	OFF	OFF	OFF	ON
Malfunction	OFF	OFF	□	OFF
Sleep mode	OFF	OFF	□	ON
During Area writing	□	OFF	□	ON
During updating	-	-	-	-

-: Undefined (could be either) ON: Current is flowing
□: Keep previous state OFF: No current flowing

9. Ethernet setting

9.1 Default value

Default value of IP: 192.168.0.10
Port No.: 10940

9.2 Changing IP

IP changes and initialization are possible using the dedicated application (IP Discovery). For details on installing and operating IP Discovery, please refer to the IP Discovery Instruction Manual (C-41-02603).

* Any attempt to obtain private commands by means such as communication analysis is prohibited. Private commands are commands that are not officially provided by our company and we do not permit their use. Using or obtaining private commands can cause serious problems with system stability and security. We are not responsible for any damages or problems resulting from the use or acquisition of private commands.

10. Revision history

Revision date	Amended No.	Details
2024/10/02	-	First edition