KANOMAX
The Ultimate Measurements

Laser Particle Sensor

MODEL 3720-06

Intense Light Particle Sensor

User's manual

Component List

◆ standard

ITEM	MODEL	QTY
3720-06 Main unit	3720-06	1
AC adapter (DC24V)	-	1
Zero filter	-	1
Manual	-	1

◆ optional Extras

ITEM	model	volume
USB-RS485 converter	3720-06-20	1
RS232C-RS485 converter	3720-06-21	1
Constant velocity suction probe	3905-07	1
Pump Unit	3720-06-22	
IP65 Protective Case	3720-06-23	

Contact KANOMAX for information on purchasing optional products.

Important Safety Information

In this manual, warning types and classifications are defined as follows:

[Classification]

⚠ WARNING: To Prevent Serious Injury or Death

Indicates a potentially hazardous situation which, if not avoided, may result in serious injury or death.

⚠ CAUTION: To Prevent Damage to the Product

Indicates a potentially hazardous situation which, if not avoided, may result in damage to the product that may void the product warranty.

[Description of Symbols]

△ Indicates a condition (including danger) that requires caution. The subject of each caution is illustrated inside the triangle (e.g., the symbol shown to the left is the high temperature caution).

⊘ Indicates a prohibition. Do not take the prohibited action shown inside or near this symbol (e.g., The symbol shown to the left prohibits disassembly).

● Indicates a mandatory action. A specific action is described near the symbol.

WARNING ⚠	
 Do not modify/disassemble	◆ Do not disassemble, modify or repair the instrument. …… Misuse of the instrument may result in electric shock, fire, or damage to the instrument, etc. …… A 3B laser diode is used as the optical source inside the instrument. Therefore, never attempt to disassemble the instrument as it is extremely dangerous.

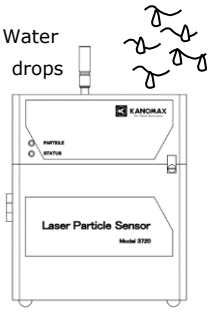
 Handle Properly.	◆ Use this instrument properly by carefully following this User's Manual. …… Misuse of the instrument may result in electric shock, fire, or damage to the instrument. etc.	
	◆ If any abnormal noises, unusual odors or smoke are observed, or any liquid enters the instrument, turn the power off immediately, remove the battery and disconnect the power cable. …… It may result in electric shock, fire or damage to the instrument. Contact your distributor or your KANOMAX service center for repair.	
 Prohibition	◆ Do not install the instrument where it will be exposed to rain and/or water drops. …… It may result in electric shock, fire, serious injury or death.	

Table of Contents

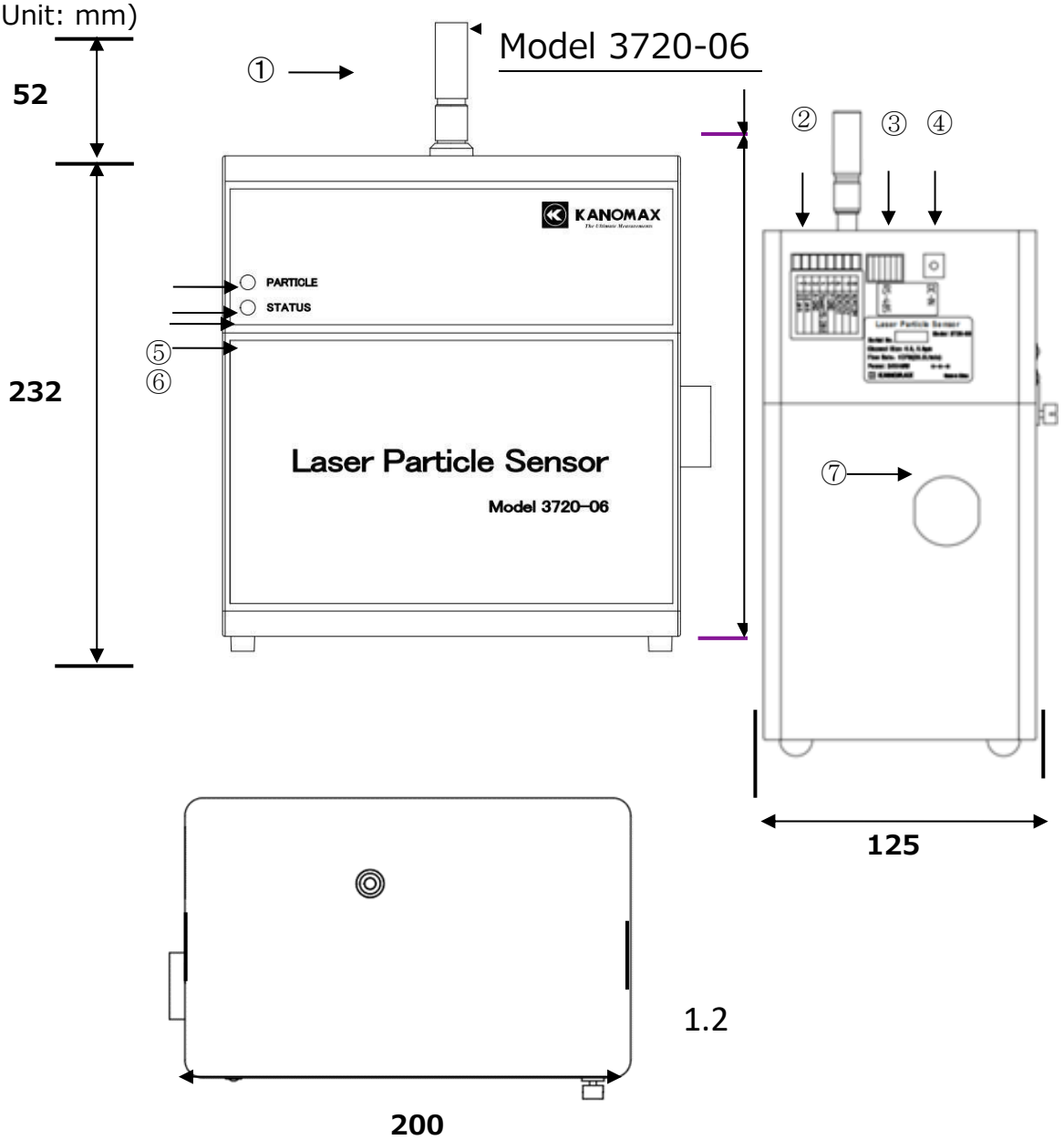
1. Names and movements of each part

1.1 summary

- This product (Model 3720-06) is a light scattering laser particle counting sensor using a laser diode as a light source. Measurement data can be output with a current of 4 ~ 20 mA.
- Can be connected to the EP-CRMS system for long-term measurements in a clean room environment.
- Status lamps can indicate LD errors and flow errors.
- Alarm output is issued when particles above the alarm-set concentration are detected according to the alarmsettings.

1.2 Part Names and Functions

(Unit: mm)



1.2

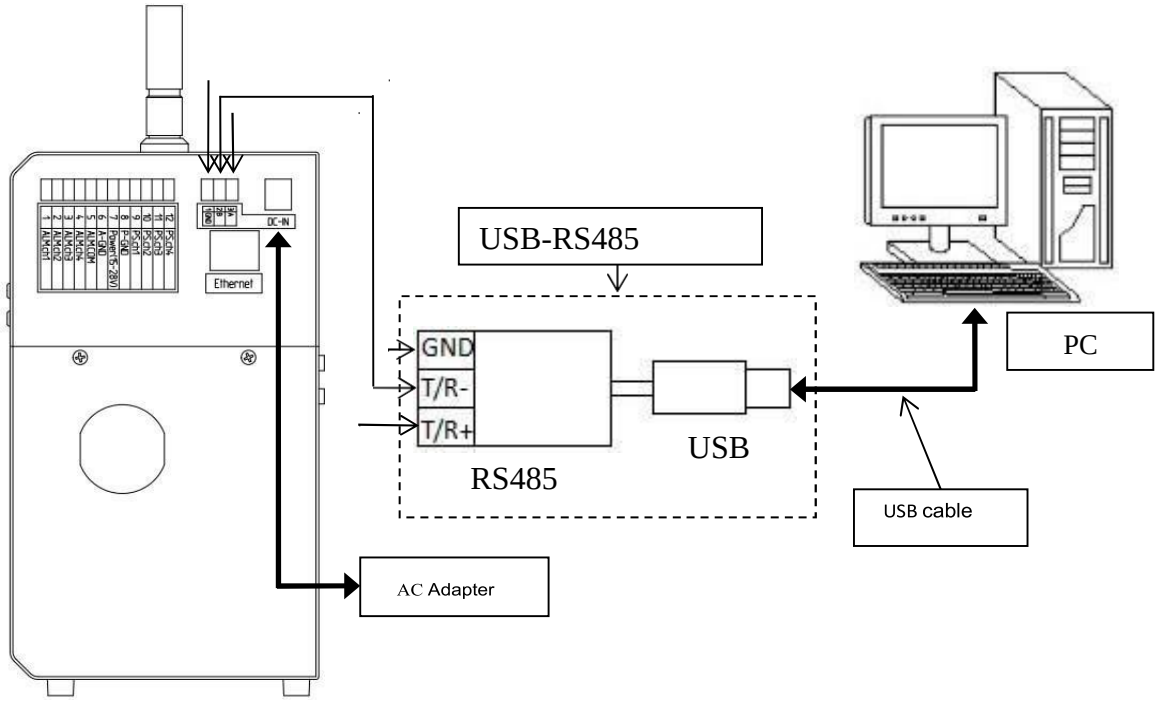
Number	name	Function
①	inlet	Sampling air suction port. A clean pipe can also be attached to the suction port for measurement. Never block the suction opening during measurement, as this will result in malfunction. Please do so.
②	Analog output terminal	DC power input, analog output terminal, and alarm output terminal. See "2.4 Analog Output Terminal Connection" for detailed functions.
③	RS485 port (e.g. LAN port)	MODBUS RTU communication connection terminal; connect a USB-RS 485 converter (converter + cable); the PC side can set parameters and read counts of this unit. (Refer to "2.5 RS 485 Terminal Connection" for details.
④	power jack	DC power jack. Use the supplied AC adapter. See "2.1.1 Adapter Use" for details.
⑤	LAN connector	MODBUS RTU communication connection terminal. Connect a router or POE switch to this terminal, which allows the PC side to set parameters and read counts of the unit. See "1.4 LAN Connection" for details.
⑥	PARTICLE. lamp	LED is orange; LED flashes each time a particle is detected. The light turns off when no pa-particles are detected.
⑦	STATUS lamp	When the flow rate and LD status are normal, the LED is lit green. If the flow rate or LD is abnormal, the lamp will light up red.
⑧	exhaust port	3720-06 is treated by a built-in filter to discharge the gas. Never block the exhaust port during measurement, as this will result in malfunction.

1.3 **USB-RS485** converter

For information on purchasing the optional USB-RS 485 converter MODEL 3720-06-20, contact your distributor or agent. If you wish to prepare your own USB-RS 485 converter, please refer to the following instructions.

- Connection method

The following is the connection method between this product, the USB-RS 485 converter, and a PC.



- How to connect RS485 terminal and USB- RS485 converter

3720-06 Main unit

USB-RS485 converter

preface	RS485 terminal
1	GND
2	B
3	A

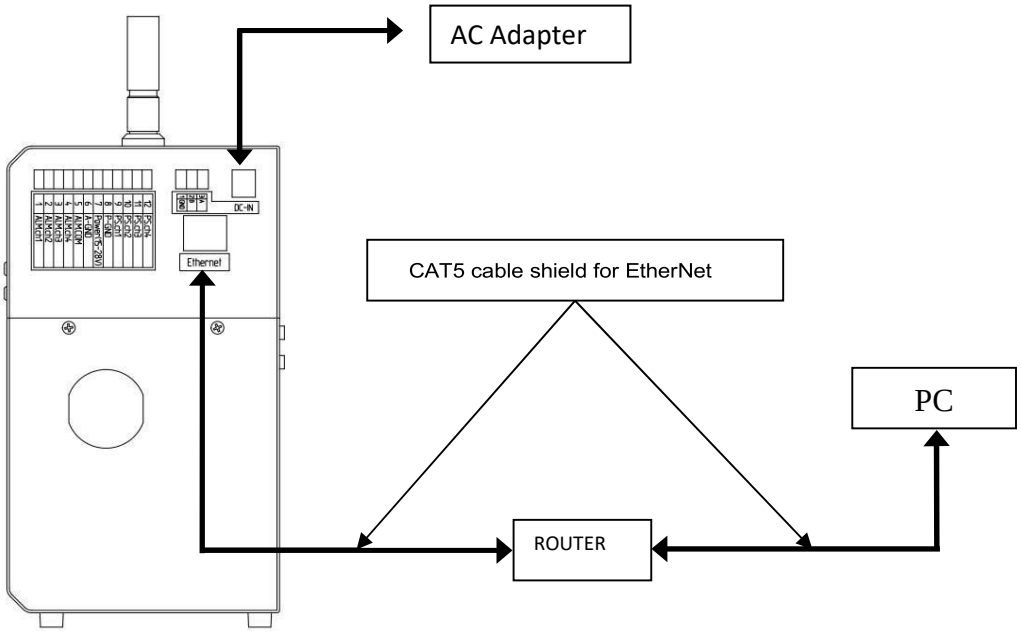
preface	RS485 converter
1	GND
2	T/R-.
3	T/R+

When in open use, insulate unused terminals.

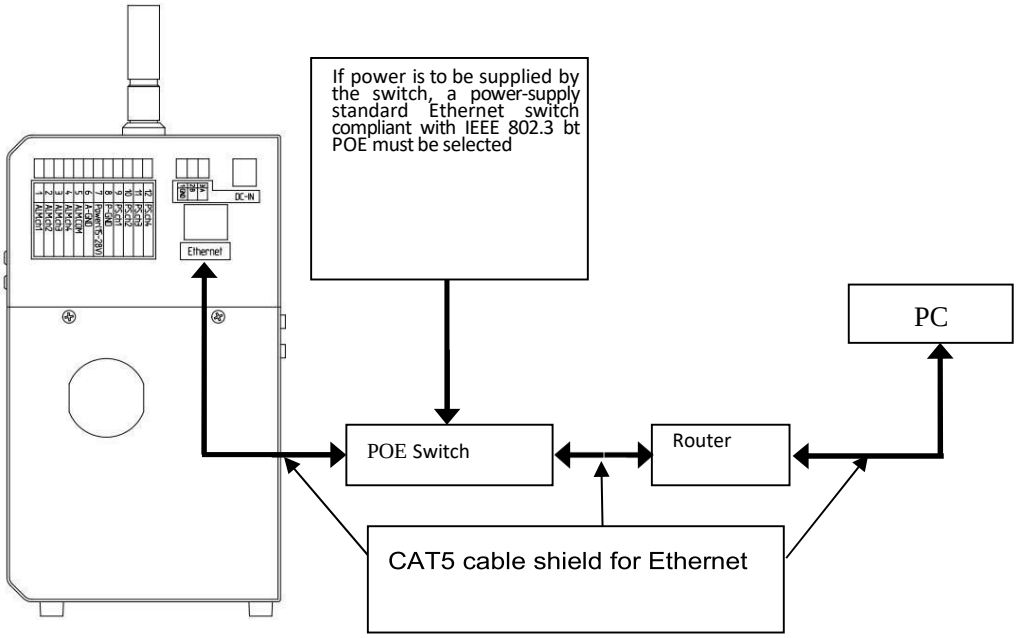
1.4 Connecting LAN

- This product is capable of MODBUS TCP communication through LAN, and can be operated in EP-CRMS system.
- Connection method

  The connection between the product and the router is shown below.



Shows the connection between this product and the POE switch.



2. Preparation before measurement

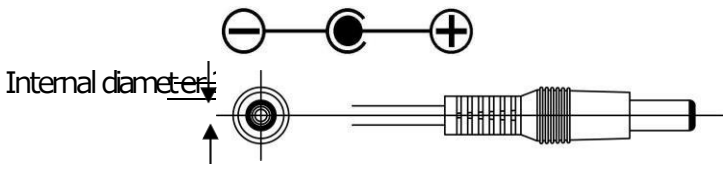
2.1 power (button on TV, etc.)

2.1.1 Use adapter

◆ Insert the AC adapter plug into the socket. Below are the AC adapter specifications that come with the product.

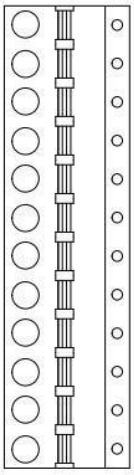
Input Output Specification: Input AC 100-240V (50-60Hz), Output DC 24V 2.1A

Plug specifications



2.1.2 Use **DC** power supply

・ Pin 7 of the analog pins can be used for Power (15-28V) and Pin 8 can be used for DC power supply by using P-GND. (Note: Be careful not to wire in the wrong order.)



12	PS. ch4
11	PS. ch3
10	PS. ch2
9	PS. ch1
8	P-GND
7	Power (15-28V)
6	A-GND
5	ALM. COM
4	ALM. ch4
3	ALM. ch3
2	ALM. ch2
1	ALM. ch1

3720-06 Model roller conveyor terminal

・ If an AC adapter is not used, use a DC power supply with overload protection.

2.1.3 Use **POE** switch

- After connecting the LAN connector and POE switch, supply power to the main unit.
- If a POE switch is used to provide power, a switch that complies with IEEE 802.3 bt POE power delivery standards must be selected, otherwise damage to the monitoring system will result.

2.2 Parameter Setting

- Before measurement, parameter setting is required, please read 3720-06 MODBUS Communication Protocol before setting.
- Connect the 3720-06, 3720-06 power supply, USB-RS485 converter (converter, cable), PC or 3720-06, POE switch, router, and PC before setting parameters.
- Sampling time setting: 1 second step set in the range of 1-60 seconds All data within the sampling time period is totaled and output via analog output (4-20 mA). This sampling time is common to all channels.

  The factory default setting is 60 seconds.
- Output range setting: Sets the particle count range and concentration range. 4-20mA analog output is generated within the set range.
  The setting range is shown below. This output range setting can be set for each channel.

  The factory default setting is 02 (0-100CNT).

Setup Code	Output range	Count/Density
01	0-10CNT	count
02	0-100CNT	
03	0-1,000CNT	
04	0-10,000CNT	
11	0-10CNT/cf	Concentration
12	0-100CNT/cf	
13	0-1,000CNT/cf	
14	0-1,000,000 CNT/cf	
21	0-353CNT/m^3	
22	0-3,530CNT/m^3	
23	0-35,300CNT/m^3	
24	0-35,300,000 CNT/m^3	

- Alarm setting: Can be set within the range of 0-100% of the measurement range in 1% steps.
  Alarm settings can be set for each channel.
  An alarm is output when the number of particles detected exceeds the concentration alarm value.

  The following is a list of the most important

  For details on alarm settings, refer to "2.4 Analog Output Terminal Connection".

  Please do so.

  The factory default setting is 100 (each channel).
- Address setting: Sets the address of the device. The setting range is 1-247. Used for identification when multiple units are connected and used.
  The following is a brief summary of the results of the study. The factory default setting is 1.

- Sensor communication settings: Configures communication settings for the monitoring system.
  Configure the communication settings between this unit and the host PC.
  Baud rate: select from 9600, 19200, 38400 bps Data bit: 8 bit
  Parity: Select even, odd, or none Stop bit:
  Select 1 bit or 2 bits
  The factory default settings are 9600 bps, 8 bit, none, and 2 bit.
- Error output setting: When flow rate or LD error is detected, current output is performed or not performed.
  ON: The current output is changed according to the contents of the abnormality. OFF:
  Measured value is output even if an abnormality is detected.

  *Please set according to the system to be connected.

2.3 Check condition of vacuum source

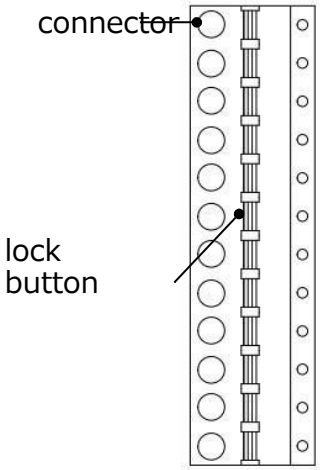
- The status of the vacuum source can be checked by the STATUS lamp on the main unit or by the output current from analog output pins 9-12. 1-1.8 mA or 3-3.8 mA output current outside the range of pin 9-12 indicates a normal condition.

  However, this output is enabled when the error output setting in

  2.2 Parameter Setting isON.

2.4 Analog output connection

- The connector of the analog output terminal of this unit has an automatic lock function. When attaching or detaching lead wires, press the lock button (orange part) on the connector to unlock it. The connector is in the locked state when the lock button is released. For connection, remove the coating from the tip of the lead wire before insertion.
- The analog terminal connector is removable, but should be kept in place as much as possible to prevent loss.



12	PS. ch4
11	PS. ch3
10	PS. ch2
9	PS. ch1
8	P-GND
7	Power (15-28V)
6	A-GND
5	ALM. COM
4	ALM. ch4
3	ALM. ch3
2	ALM. ch2
1	ALM. ch1

inal

・ The analog output pins are described below.

terminal number	3720-06 Signal name	Function Description
1	ALM.ch1	Channel 1 measurement particle count or concentration output upon alarm detection terminal. The contact specification for this terminal is 60 V 0.4 A or less. This Use within the range of
2	ALM.ch2	Channel 2 measurement particle count or concentration output upon alarm detection terminal. The contact specification for this terminal is 60 V 0.4 A or less. Use within this range.
3	ALM.ch3	Channel 3 measurement particle count or concentration output upon alarm detection terminal. The contact specification for this terminal is 60 V 0.4 A or less. Use within this range.
4	ALM.ch4	Channel 4 measurement particle count or concentration output upon alarm detection terminal. The contact specification for this terminal is 60 V 0.4 A or less. Use within this range.
5	ALM.COM	Minus common terminal of alarm output resistor.
6	A-GND	Minus common terminal for current output.
7	Power(15-28V)	DC power "+" connection terminal.
8	P-GND	DC power "GND" connection pin.

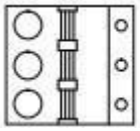
9	PS.ch1	1. Channel 1 Current output terminal for the number of particles or concentration of the measurement. Output range is 4-20mA. 2. This output terminal is also used when a main unit flow error or LD error is detected. The current output range for flow error is 1-1.8 mA, and for LD error is 2-2.8 mA. When flow rate and LD error occur simultaneously, the current output range is 3-3.8 mA. Note that this output is only available if the error output setting in 2.2 Parameter Setting is set to It is enabled when it is turned on.
10	PS.ch2	1. Current output terminal for particle count or concentration for channel 2 measurement. The output range is 4-20mA. 2.This output terminal is also used when a main unit flow error or LD error is detected. The current output range for a flow error is 1-1.8 mA, and that for an LD error is 2-2.8 mA. When flow rate and LD error occur simultaneously, the current output range is 3-3.8 mA. Note that this output is only available if the error output setting in 2.2 Parameter Setting is set to The setting is enabled when it is turned on.
11	PS.ch3	1. Current output terminal for the number of particles or concentration of channel 3 measurement. Output range is 4- 20mA. 2.This output terminal is also used when a main unit flow error or LD error is detected. The current output range for a flow error is 1-1.8 mA, and that for an LD error is 2-2.8 mA. When flow rate and LD error occur simultaneously, the current output range is 3-3.8 mA. Note that this output is only available if the error output setting in 2.2 Parameter Setting is set to The setting is enabled when it is turned on.
12	PS.ch4	1. Current output terminal for particle count or concentration for channel 4 measurement. The output range is 4-20mA. 2.This output terminal is also used when a main unit flow error or LD error is detected. The current output range for a flow error is 1-1.8 mA, and that for an LD error is 2-2.8 mA. When flow rate and LD error occur simultaneously, the current output range is 3-3.8 mA. Note that this output is only available if the error output setting in 2.2 Parameter Setting is set to The setting is enabled when it is turned on.

2.5 **RS485** pin connection

- 3720-06 When setting parameters, first use the optional USB-RS 485 converter (converter).

  +Connect the RS 485 terminal to the PC using the RS 485 + connection cable). Refer to 3720-06 MODBUS Communication Protocol for setting parameters of the main unit.

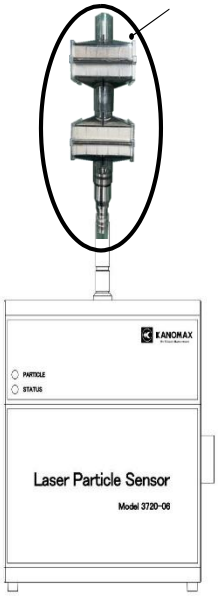
RS485 terminal



3	A
2	B
1	GND

2.6 Zero filter connection

- Perform a zero check before measurement to verify the cleanliness of the optical system.
- Connect the tube side of the filter to the adapter of the main unit.
- Handle filters with care.
- If air leaks between the filter and the main unit occur, correct zero check will not be possible.



Zero-point

3. measurem

- Make sure that "2. Preparation before measurement" in the instruction manual has been completed.
- For measurement, inhale sample air directly from the inlet of the 3720-06. Also, connect the supplied Tygon tube to the inlet to inhale sample air.
- Turn on the power to the 3720-06. T h e main unit will start measurement with the parameters already set.
- Failure is confirmed by the state of the main unit STATUS lamp, output current value of the analog output terminal, alarm output state, etc.

  If the problem is detected, investigate the cause of the problem by referring to "5. If the problem persists, contact the place of purchase or KANOMAX. If the problem persists, contact the place of purchase or KANOMAX.
- If protection level IP65 is required, optional IP65 protection case (MODEL (3720-06-23).
- If the built-in vacuum source has exceeded its service life during continuous operation, replace the pump assembly.
- The product is capable of storing 5000 measurement data. Stored data includes storage time, product status, and particle count values. Data is saved every sampling time after the product is turned on. After more than 5000 pieces of data have been stored, they are no longer stored and all stored data can be read back to perform a stored data deletion operation. See 3720-06 MODBUS Communication Protocol for information on how to read and erase stored data.

4. Main specifications

Name	Laser Particle Sensors
Model	3720-06
Exhaust Filters	built-in
particle size division	0.5μm、5.0μm (2-4CH selectable from 0.5um, 0.7um, 1.0um, 3.0um, 5.0um, 10.0μm by customization. (Customers cannot change CH by themselves.)
Flow rate	28.3L/min(1CFM)
Light source	Laser Diode
counting efficiency	ISO 21501-4, JIS B 9921
Maximum permissible concentration	1000,000CNT/ft3
Data Storage	5000 pcs.
Setting Parameter	Sampling time : 1 sec-60 sec
	Output range setting (set for each particle size) Count: 0-10CNT, 0-100CNT, 0-1,000CNT, 0-10,000CNT Concentrations: 0-10CNT/cf, 0-100CNT/cf, 0-1,000CNT/cf, 0-1,000,000CNT/cf 0-353CNT/ m^3 , 0-3,530CNT/m^3 , 0-35,300CNT/m^3 0-35,300,000 CNT/m^3
	Alarm setting: 0%-100
	Address setting: 1-247
	Error output setting: ON/OFF
sampling po	Built-in small brushless motor FAN (life time > 20,000 hr)*
interface	Ethernet, RS485, analog output (4-20mA)
Communication	Modbus(TCP/IP), Modbus(RTU)

Power source	② AC Adapter AC adapter AC 100-240V (50-60Hz), DC 24V 2.1A ②Power supply DC 15V-28V 2.0A DC power supply DC 15V-28V 2.0A ③POE switch power supply 802.3bt (PoE++)
Usage	10 to 30°C 20 to 85%RH (no condensation)
environment	
Storage environment	-10 to 50°C, 95%RH or less (no condensation)
External dimensions of main unit	180 (W) x 110 (D) x 190 (H) mm
Weight	3.4 kg
Standard accessories	Manual (1 volume), AC adapter (1 pc), zero filter (1 set)
optional goods	USB-RS485 converter 3720-06-20, RS232C-RS485 converter 3720-06- 21 Constant velocity suction probe 3905-07 (1 piece), pump unit 3720-06-22, IP65 Protective case 3720-06-23

*To ensure proper operation of this product, use it within the operating life of the vacuum source.

5. Is it malfunctioning?

failure	Failure Cause/Measures	reference page gi
Power will not turn on.	Defective adapter → Adapter replacement	5
	Poor connection of DC power leads → reconnect	5
	Faulty POE exchange connection → Heavy new and POE exchange connection	5
"STATUS" lamp No lights on	Power supply not connected → Connect power supply	5
	Damaged lamp → Return for repair	13
"STATUS" lamp Red light	Vacuum source not operating. Refer to →3720-06 MODBUS Communication Protocol.	7
	Leaking vacuum source piping. Or clogged pipe. →Examine the vacuum source for leaks. Eliminate clogged areas. be just about to	-
	Piping inside the unit is clogged. →Returns and Repairs	13
	Torn internal parts of the main unit → return for repair	13
When a particle is detected. "PARTICLE" light does not blink.	Torn internal parts of the main unit → return for repair	13
Analog output 4~20mA output error	Analog output wiring error → Correct wiring	7
	If the error output setting is on, the current output is 4 mA or less according to the error.	7
	Internal circuit failure → Return for repair	13
Alarm terminal output abnormal	Analog output wiring error → Correct wiring	7
	Internal circuit failure → Return for repair	13

EP-CRMS and EP-CRMS wireless sensors are communicating and measuring numbers are not stable.	misconnection →Check the connection method	4
	Circuit failure of main unit → Return for repair	13
	EP-CRMS system misconfiguration →Contact KANOMAX	13

6. Product Warranty and After-Sales Service

6.1 Product Warranty

- We do not issue product warranties.
- A user registration guide is attached to the product. Please follow the instructions and complete the user registration on the top page of our website. Once registered, we will start the warranty. Please note that without registration, we may not be able to guarantee the product.

  The warranty period for quality problems caused by operation according to the instruction manual is 3 years from the date of purchase.

6.2 after-sales service

- If you're not feeling well, check first...
  Please read the section "5. If you think the product is malfunctioning, please read "5.
- Still, if you're not feeling well...
  Please contact the distributor, Kanomax Japan K.K. (see last page), or the distributor where you purchased the product.
- Repairs under warranty are...
  If the failure is caused by our manufacturing, circuit components, or materials, we will repair it free of charge.
- Repairs after the warranty period has expired are...
  If the function and accuracy can be maintained by repair, we will repair it at your request for a fee.
- Retention period for repair parts...
  Repair parts will be held for a minimum of 5 years after discontinuation of production. This is the period during which the parts are available for repair. For details, please contact the distributor, Japan Kanomax Co.

When you contact us, please let us know thefollowing

* product	Laser particle sensor 3720-
Product	06
Name	○○○○○○
* Failure	in as much detail as
status	possible

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