



Trademark registered in
Japan and China

Installation and Operating Manual

RKMC-EGWMS

Exhaust Gas Washwater Monitoring System

Request for the Customers

- Read and understand this operating manual before using the Exhaust Gas Washwater Monitoring System (EGWMS).
- Use the EGWMS in accordance with the operating manual.
- Regardless of warranty period, we shall not make any compensation for accidents and damage caused by using this product.
- The compensation shall be made only under the warranty policy of products or parts replacement.
- Because this is a monitoring unit, a daily inspection and maintenance for every week/three months, regular maintenance must be performed.
- If any abnormality was found in the EGWMS, please check the trouble shooting. If still can't resolve them, notify them to RKMC Co., Ltd.

RKMC Co., Ltd

Tel: +86 25 8361 2377

Email: info@RKMC-asia.com

RKMC Co.,Ltd is the name changed from Riken Marine China. Co.,Ltd.

This change is only related to the name of the company,

All rights and obligations of the Old Contracts are under taken by RKMC Co.,Ltd.

Factory and Products Type Approved By:



REV	DATE	PAGE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	2025.09.09	ALL	Installation and Operating Manual	Chen	DAVE	JAC.

R.FILE NO : RKMC-EGWMS-1



Safety information

The EGWMS Model RKMC-EGWMS is an Exhaust Gas Washwater Monitoring System designed to provide a simple and reliable washing water monitoring solution, fully compliant with MEPC. 340 (77). It is designed for precise measurement of exhaust gas purification systems (EGCS) and is an economical and efficient solution that complies with increasingly stringent emission regulations.

Please read the “safety” part seriously before use, so as to ensure that this product can work normally and stably for a long time.



Warning

Nonobservance with corresponding safety precautions might cause injury to the operator or huge property loss.



Caution

Important information to be noted during operation or relevant information described in the manual.

The system does not meet the explosion-proof requirements. Do not install the system in an environment with explosive gas. Otherwise, explosion and fire accidents may occur and personal safety may be endangered.

Ensure ground connection of the equipment. Ground connection of the equipment can minimize the risk of electric shock.

Please do not disassemble and assemble the equipment when the power is switched on. In order to prevent electric shock and equipment damage, please operate the equipment after taking down the cable and discharging the electric energy of interior circuit.

Do not take away the circuit board with naked hands, to avoid damages caused by static electricity.

Please use the protection tools. Please use protection tools like high-temperature gloves as required in operation, to prevent scalding or scratching of hands.

You will violate the safety standards for design, manufacturing and use of this equipment if you ignore the security countermeasures or fail to observe the warnings about specific matters in this manual. Our company assumes no responsibility for all consequences caused by the above users' negative acts.

NOTE: EGWMS detection sensors require regular calibration, or irregular calibration and cleaning in the event of abnormal readings. Please use the calibration solution provided or specified by our company to avoid unexpected damage to the equipment.

<Contents>

1 Product presentation	- 6 -
1-1 Product appearance	- 6 -
2 Product components and diagram.....	- 8 -
2-1 System Components	- 8 -
2-2 Main unit function description	- 9 -
2-3 Schematic diagram & wiring diagram	- 10 -
3 Transportation and installation.....	- 31 -
3-1 Scope.....	- 31 -
3-2 Packaging.....	- 31 -
3-3 Transportation	- 31 -
3-4 Lifting and transportation	- 32 -
3-5 Storage	- 32 -
3-6 Installation.....	- 32 -
3-6-1 Connection of washing water pipeline	- 32 -
3-6-2 Cable/Wiring Connections	- 33 -
3-7 Save after installation.....	- 33 -
3-8 Limitation of liability	- 33 -
4 Debugging/startup of washing water monitoring system	- 34 -
4-1 Scope.....	- 34 -
4-2 Files required for debugging and startup	- 34 -
4-3 General inspection before starting/adjusting	- 34 -
4-4 Start/Adjust	- 34 -
4-5 System power on	- 37 -
4-6 Document	- 37 -
5 Operation and maintenance of washing water monitoring system	- 38 -
5-1 Scope.....	- 38 -
5-2 System operation.....	- 38 -
5-3 Troubleshooting	- 61 -
6 On site calibration of sensors	- 64 -
6-1 PAH sensor calibration	- 64 -
6-2 pH sensor calibration	- 68 -
6-3 Turbidity sensor calibration	- 72 -
7 Technical Specification	- 76 -
7-1 RKMC-EGWMS System parameters	- 76 -
7-2 Sensor parameters	- 77 -

7-2-1 Technical parameters of turbidity probe:	- 77 -
7-2-2 Technical parameters of pH probe	- 78 -
7-2-3 Technical parameters of PAH probe	- 79 -
7-2-4 Technical parameters of flowmeter	- 80 -
8 Spare parts	- 81 -
8-1 Spare part list	- 81 -
8-2 Recommended replacement cycle for consumables	- 82 -
9 RKMC standard warranty	- 83 -
10 World service net	- 84 -

1 Product presentation

1-1 Product appearance

The system adopts an upper and lower water electricity separation structure, with the upper part consisting of an electrical control unit, an industrial touch panel, and the lower part consisting of a pipeline detection unit. Each unit adopts a relatively independent structural layout, which is easy to operate and maintain. The DN25 UPVC flange connection (GB2506 PN16) of the inlet and outlet pipelines ensures safe operation under pressure, with IP56 electrical protection, fully adapting to the requirements of graded application environments.

The product appearance is as follow:



1 Product presentation

The system consists of an industrial control panel, signal acquisition cabinet, pH sensor, PAH sensor, turbidity sensor, flow meter, defoamer and connecting pipe accessories.



2 Product components and diagram

2-1 System Components

NO	Part number	Part Name	Description	Quant.
1	RKMC-TPC-01	7-inch touch panel	HMI DC24V	1
2	RKMC-TD-AO-8	acquisition module	DC24V RS485	1
3	RKMC-TD-DI/O-8	acquisition module	DC24V RS485	1
4	RKMC-SDR-120	switch power	Input: 200V-240VAC 50/60Hz Output: DC24V	1
5	RKMC-KA-02	relay	AC220V	1
6	RKMC-KA-01	relay	DC24V	1
7	RKMC-SW-16	circuit breaker	AC220V 50/60 Hz 16A	1
8	RKMC-HL-W-220	white light	white AC220V	1
9	RKMC-KS-B	knob switch	DC24V	1
10	RKMC-PT-02	PH sensor	DC24V RS485	1
11	RKMC-PA-500	PAH sensor	DC24V RS485	1
12	RKMC-TU-1000	Turbidimeter	DC24V RS485	2
13	RKMC-FM-01	flow meter	DC24V RS485	2
14	RKMC-CPQ-01	Defoamer	UPVC G1/4	2
15	RKMC-LTC-01	liquidity pool	UPVC G1/4	1
16	RKMC-LTC-02	liquidity pool	UPVC G1/4	1
17	RKMC-BP-01	diaphragm pump	DC24V	1
18	RKMC-YTF-01	Y-shaped filter	UPVC DN15	2
19	RKMC-YN60Z-16	Pressure gauge	1.6Mpa	2
20	RKMC-PF	pipe fittings	UPVC	1
21	RKMC-FL-DN25	Flange	UPVC DN25	4

2-2 Main unit function description

Part number	Part Name	Picture	Function
RKMC-PT-02	PH sensor		Measurement principle: glass electrode method Working range: 0-14 pH Measurement accuracy: ± 0.02 pH Resolution: 0.01 Protection level: IP68 Temperature range: 0-50 °C Communication interface: RS-485, Modbus RTU Rated power: 0.3W
RKMC-PA-500	PAH sensor		Measurement principle: UV fluorescence method Range: 0-1000ppb (PAH) Resolution: 0.01ppb Detection limit: 1 ppb Protection level: IP68 Temperature range: 0-50 °C Communication interface: RS-485, Modbus RTU Rated power: 0.8W;
RKMC-TU-1000	Turbidimeter		Working principle: 90 ° light scattering method Working range: 0.1-1000NTU or 0.1-4000NTU Measurement accuracy: $\pm 5\%$ or 0.3NTU Protection level: IP68 Temperature range: 0-50 °C Communication interface: RS-485, Modbus RTU Rated power: 0.6W

RKMC EGWMS DRAWING DESCRIPTION

Commonly used electrical component symbols			
No.	Text symbols	Pictorial symbols	Name
1	QF		Breaker 2P 10A
2	V		Switch power
3	KA		Relay 4NO14NC
4	K.KN.K		Relay 2NO12NC
5	SB		Button
6	H		Light
7	Hz		Buzzer

Commonly used electrical component symbols			
No.	Text symbols	Pictorial symbols	Name
8	HA		Beacon
9	HMI		Repeater (10inch) Repeater (7inch)
10	P		Sampling pump
11	SV (SV(A-B-E))		3-way solenoid valve (Manifold type) 3-way solenoid valve (Single type)
12	FL		Flow meter with flow sensor
13	FS		Flow switch

Commonly component symbols		
No.	Symbol	Name
1	A	Control unit (Boards)
2	CPU	PLC
3	DO	Digital output
4	AI	Analog input
5	AO	Analog output
6	TP	Switch hub
7	RS	RS-485 Signal isolation module
8	AF	Air filter
9	GF	Gas inlet port with filte
10	OF	On-Line filter
11	3MV	3-way manual valve
12	FA	Flame arrestor
13	MS	Mist separator
14	FM	Flow meter
15	ST	Stop valve
16	RE	Reducing valve
17	BV	Ball valve
18	MV	Miniature valve
19	NV	Non-return valve
20	NRV	Non-return valve
21	AJ	vacuum pump
22	XPS	Power terminals
23	X	Signal terminals

NOTE:

- Common component symbols are shown in the table.Each component has a unique symbol.
- The system do not share 24V power supplies, pay attention to distinguish.
(P+:24V+ N:-24V-)
- XPS(220V):220V power terminal
XPS(24V): 24V power terminal with 5A fuse
- Single terminals
- If you have any questions, you can consult the manufacturer.

4									
3									
2									
1									
0									
REV.	DATE	REVISION CAUSE	DRAWN	CHECKED	APPROVED				

投影法
PROJECTION

比例
SCALE

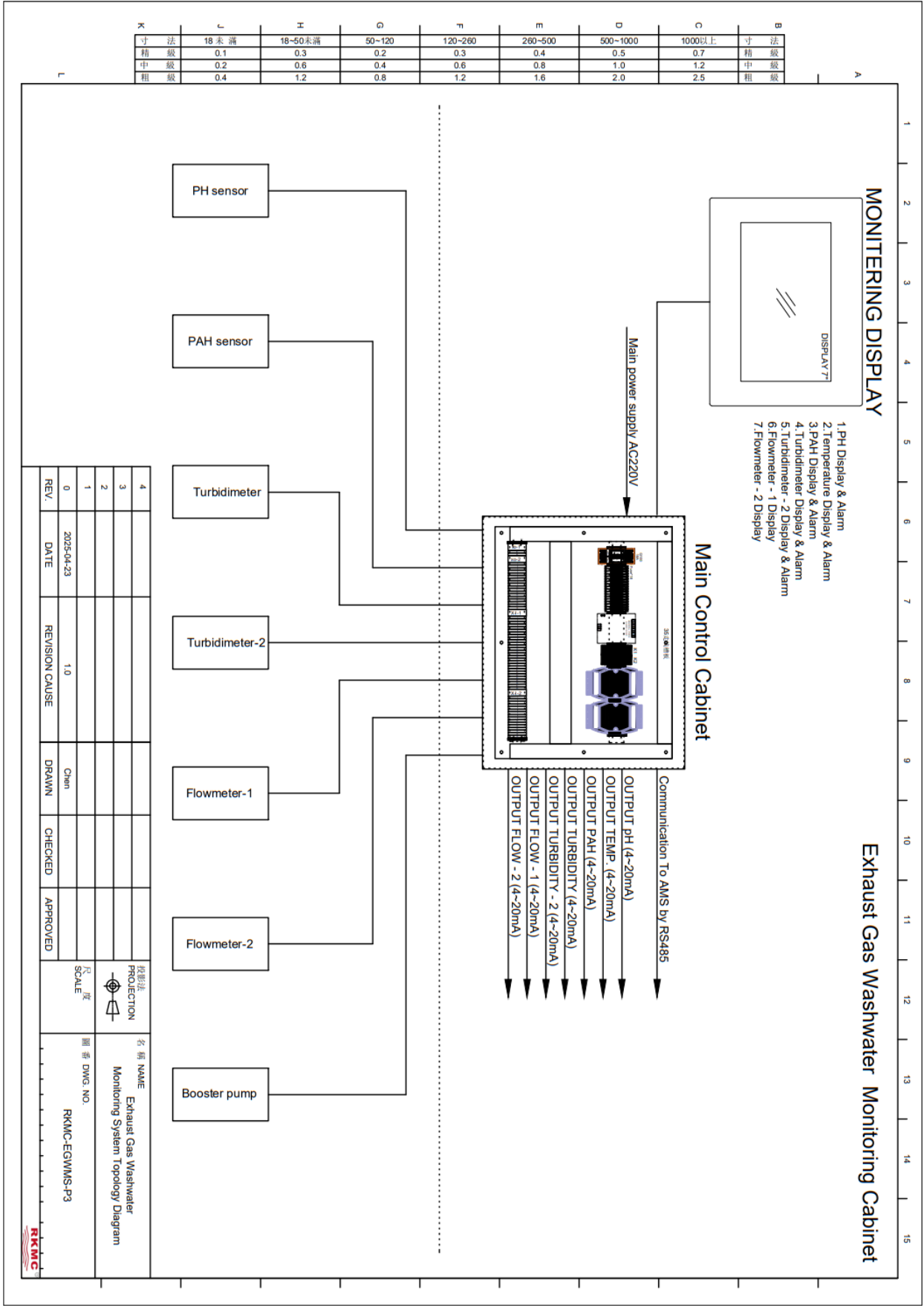
名 稱 NAME

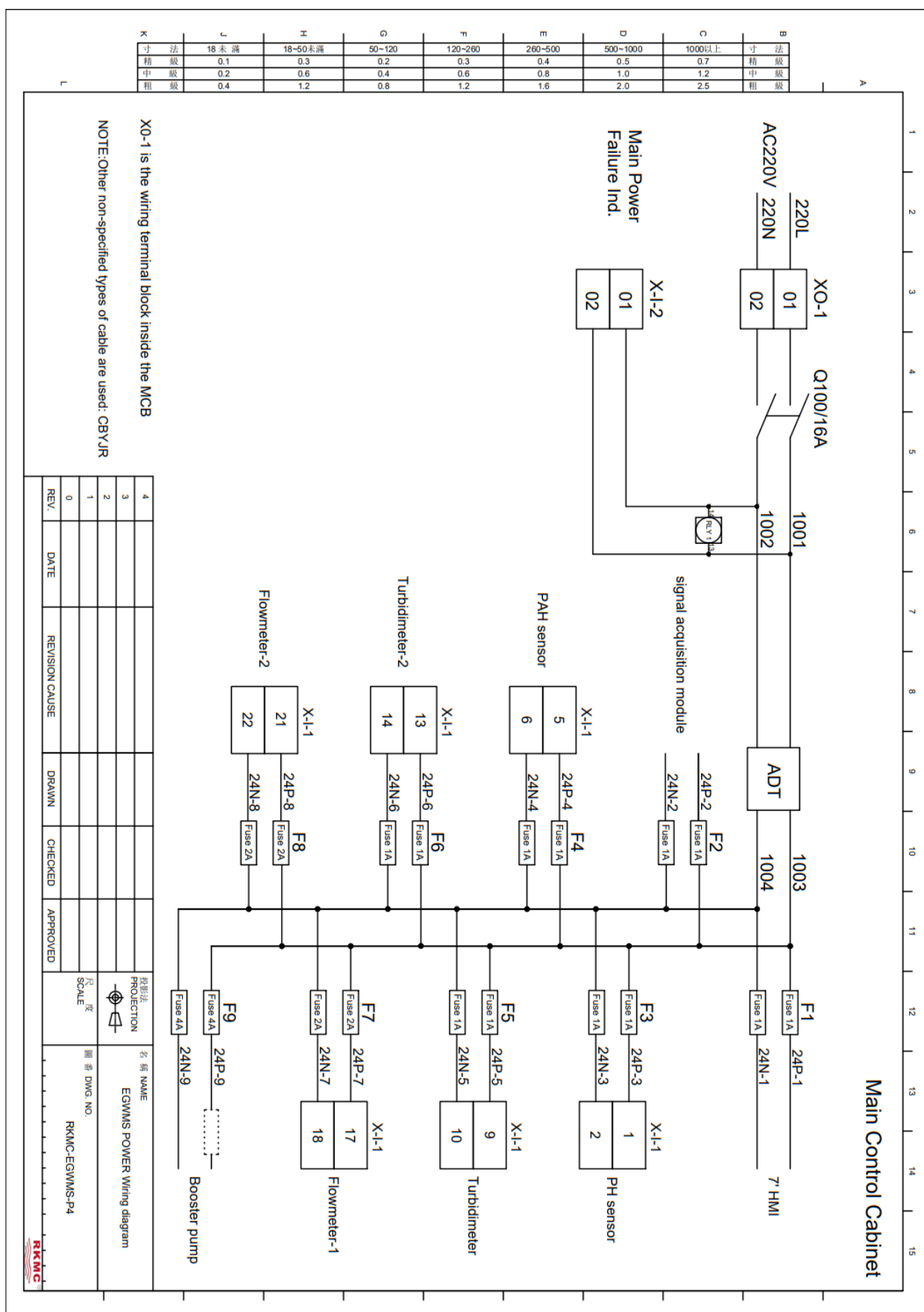
Acquisition module TD-AO-8

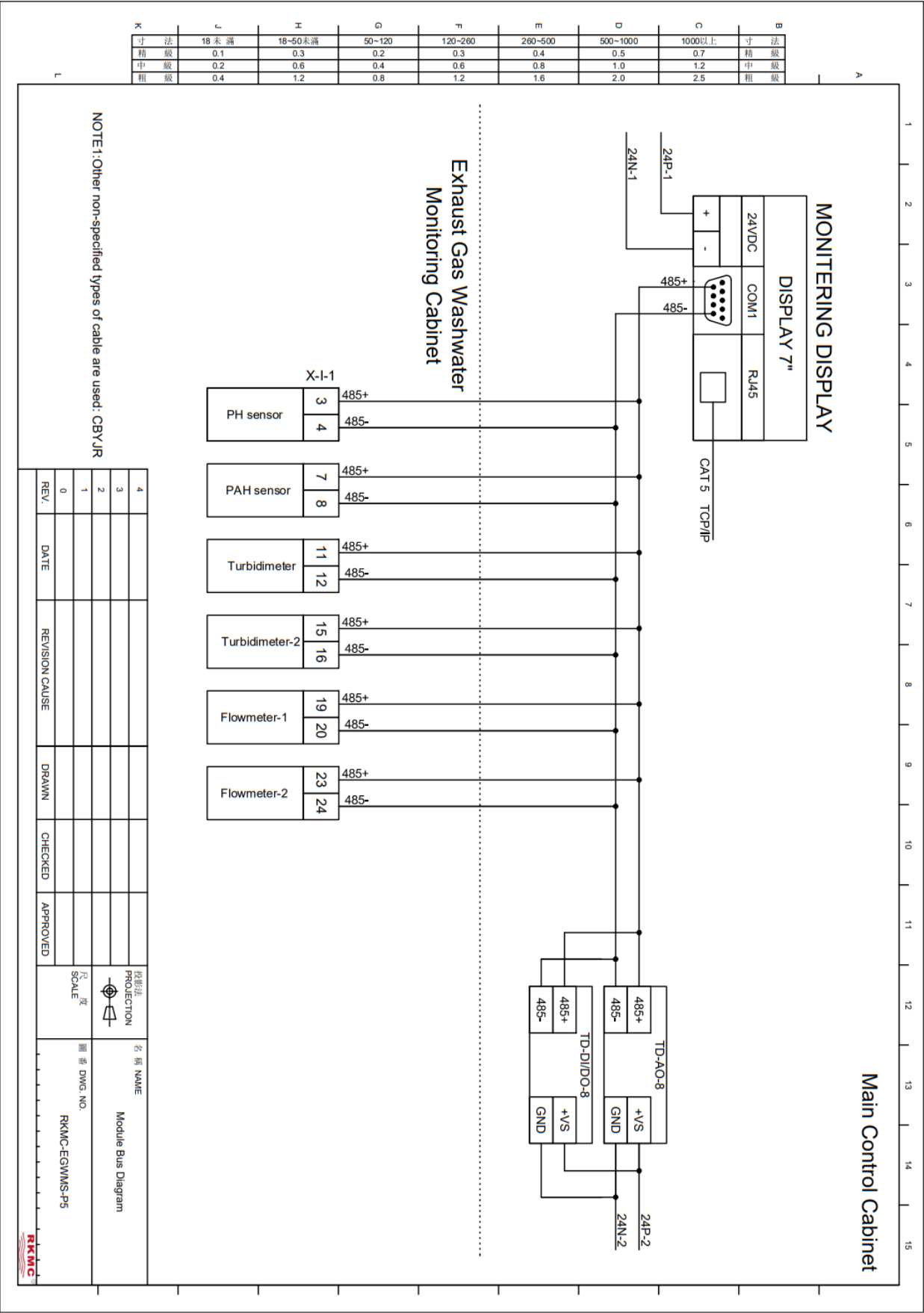
outline drawing & technical parameters

圖 番 DWG. NO.

RKMC-EGWMC-P2







Module name: TD-DI/O-8

Main technical parameters

Input terminal

Switching value: 8-channel dry node and wet node
Input mode: digital quantity, rising edge counting, falling edge counting
Counter: 16 bit incremental counting frequency: ≤ 100Hz

Output terminal

Switching value: 8-channel NPN type collector open circuit output with built-in freewheeling diode
Output current: ≤ 200mA

Communication terminal

Signal type: RS-485 digital signal

Baud rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200bps

Verification method: no verification, odd verification, or even verification

Data bit: 8 bits Stop bit: 1 bit

Communication protocol: Standard MODBUS-RTU protocol

Communication distance: 1200m (typical value)

Basic parameters

Power supply: DC24V, voltage range: DC 9~30V

Power consumption: <1.5W @ DC 24V

Insulation strength: 1500V DC/1min (between input, output, and communication)

Insulation resistance: ≥ 100M Ω (between input and output)

Electromagnetic compatibility: in accordance with GB/T 18268.1 (IEC 6132-1)

Indicator light status

- After powering on, the power indicator light is constantly on, but not on indicates a power failure or poor contact;
- During normal communication, the floor heating indicator light flashes;
- When not communicating, the power indicator light flashes to indicate a module malfunction
- When the switch input is valid, the corresponding indicator light will turn on, otherwise it will turn off
- When the switch output is valid, the corresponding indicator light will turn on, otherwise it will turn off

Usage environment

- (1) There should be no strong vibrations, impacts, high currents, sparks, or other electromagnetic induction effects in the surrounding environment. The air should not contain media that corrode chromium, nickel, and silver coatings, and should not contain flammable or explosive substances;
- (2) Continuous working temperature: -40℃~+85℃;
- (3) Relative humidity: 10%~90% R H (without condensation);

Manufacturer: TAIHUA instrument

NOTE: Other non-specified types of cable are used: CBYJR

The diagram illustrates the wiring connections for the TD-DI/O-8 module. On the left, the DO (Digital Output) terminals are shown, ranging from DO_14 down to DO_COM. A DC24V power source is connected to DO_14 through a resistor labeled 'R'. Below this, the DI (Digital Input) terminals are listed from DI_COM down to DI_1. These are connected to a DRY CONTACT, which is also linked to a DC24V source. The diagram includes labels for 'DO COM 14', 'DO_0', 'DO_1', 'DO_2', 'DO_3', 'DO_4', 'DO_5', 'DO_6', 'DO_7', 'DI_COM 1', 'DI_2', 'DI_3', 'DI_4', 'DI_5', 'DI_6', 'DI_7', 'DI_GND 8', 'NC', 'DATA+', 'DATA-', '+VS', and 'GND'. It also shows a 'DC24V' source and a 'DRY CONTACT' switch.

4						投影法 PROJECTION	名称 NAME	TD-DI/O-8
3						图例 SCALE	接线图及技术参数 Wiring diagram & technical parameters	
2							图号 DWG. NO.	RKMC-EGWMS-P6
1								
0								
REV.	DATE	REVISION CAUSE	DRAWN	CHECKED	APPROVED			

RKMC

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Module name: TD-AO-8

Main technical parameters

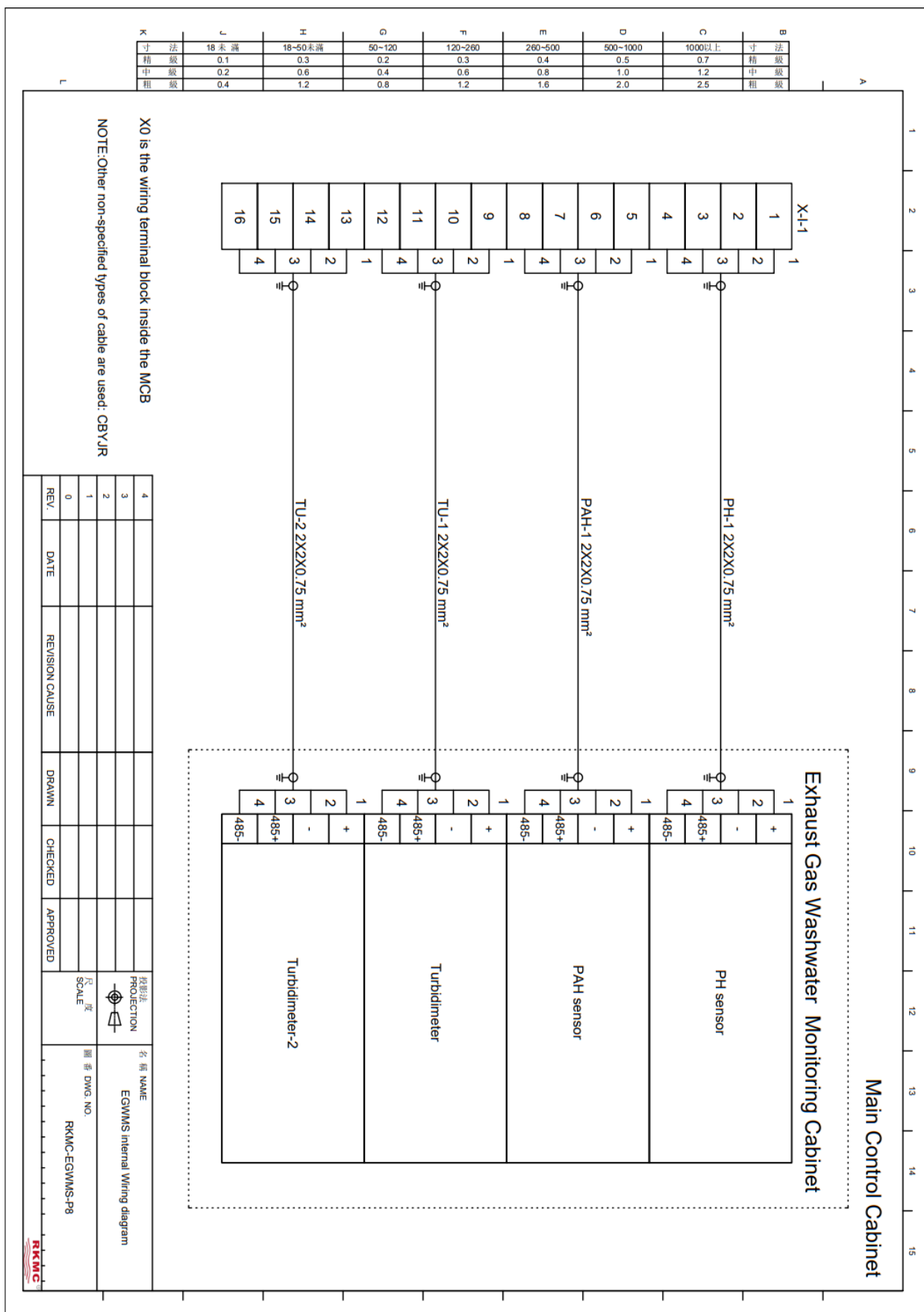
- Output terminal
- Number of channels: 8
- Output range:4-20mA
- Output method: Eight channel current output
- Output frequency:<100Hz
- Accuracy level: ≤ 0.1%
- Output load: current<350 Ω, voltage>10K Ω
- Signal type: RS-485 digital signal
- Baud rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200bps
- Verification method: no verification, odd verification, or even verification
- Data bit: 8 bits Stop bit: 1 bit
- Communication protocol: Standard MODBUS-RTU protocol
- Communication distance: 1200m (typical value)
- Basic parameters
 - Power supply: DC24V, voltage range: DC 9-30V
 - Power consumption:<1.5W @ DC 24V
 - Insulation strength: 1500V DC/1min (between input and output)
 - Insulation resistance: ≥ 100M Ω (between input and output)
 - Electromagnetic compatibility: In accordance with GB/T 182681 (IEC 6132-1)
- Indicator light status
 - 1. After power on, the indicator light remains on, but if it is not on, it indicates a power failure or poor contact;
 - 2. During normal communication, the indicator light flashes;
 - 3. When not communicating, the indicator light flashes to indicate a module malfunction
- Usage environment
 - (1) There should be no strong vibrations, impacts, high currents, sparks, or other electromagnetic induction effects in the surrounding environment. The air should not contain media that corrode chromium, nickel, and silver coatings, and should not contain flammable or explosive substances;
 - (2) Continuous working temperature: -40 ℃~+85 ℃;
 - (3) Relative humidity: 10%~90% R H (without condensation);
- Manufacturer: TAIHUA instrument

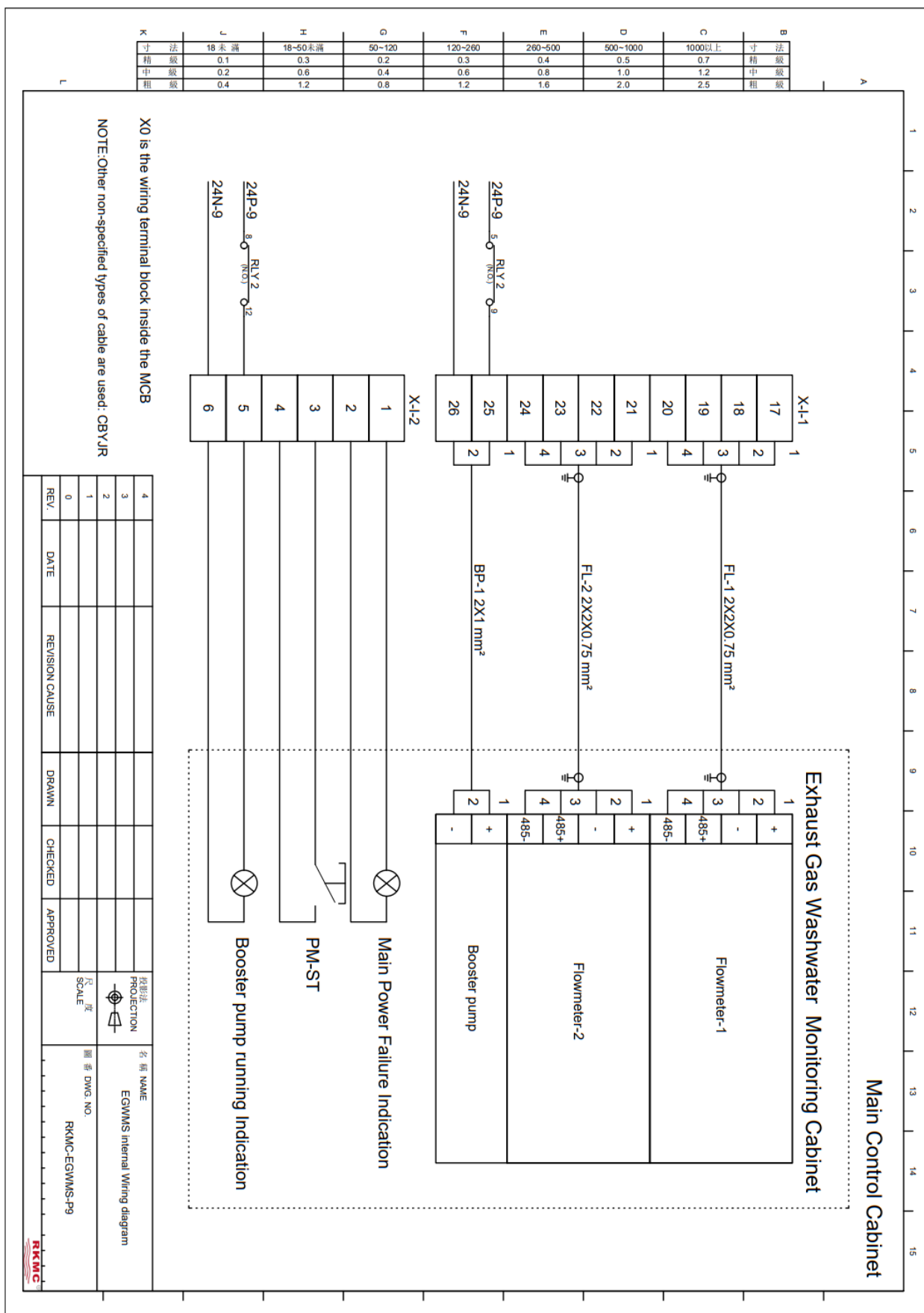
The diagram shows the TD-AO-8 module with its pin headers. On the left, there are pins for GND, AO_0, AO_1, AO_2, AO_3, AO_4, AO_5, AO_6, and AO_7. A resistor labeled 'R' is connected between the top of the module and the GND pin. On the right, there are pins for DATA+, DATA-, +VS, and GND. Wires connect these pins to external components: DATA+ to 485+, DATA- to 485-, +VS to 24P, and GND to 24N.

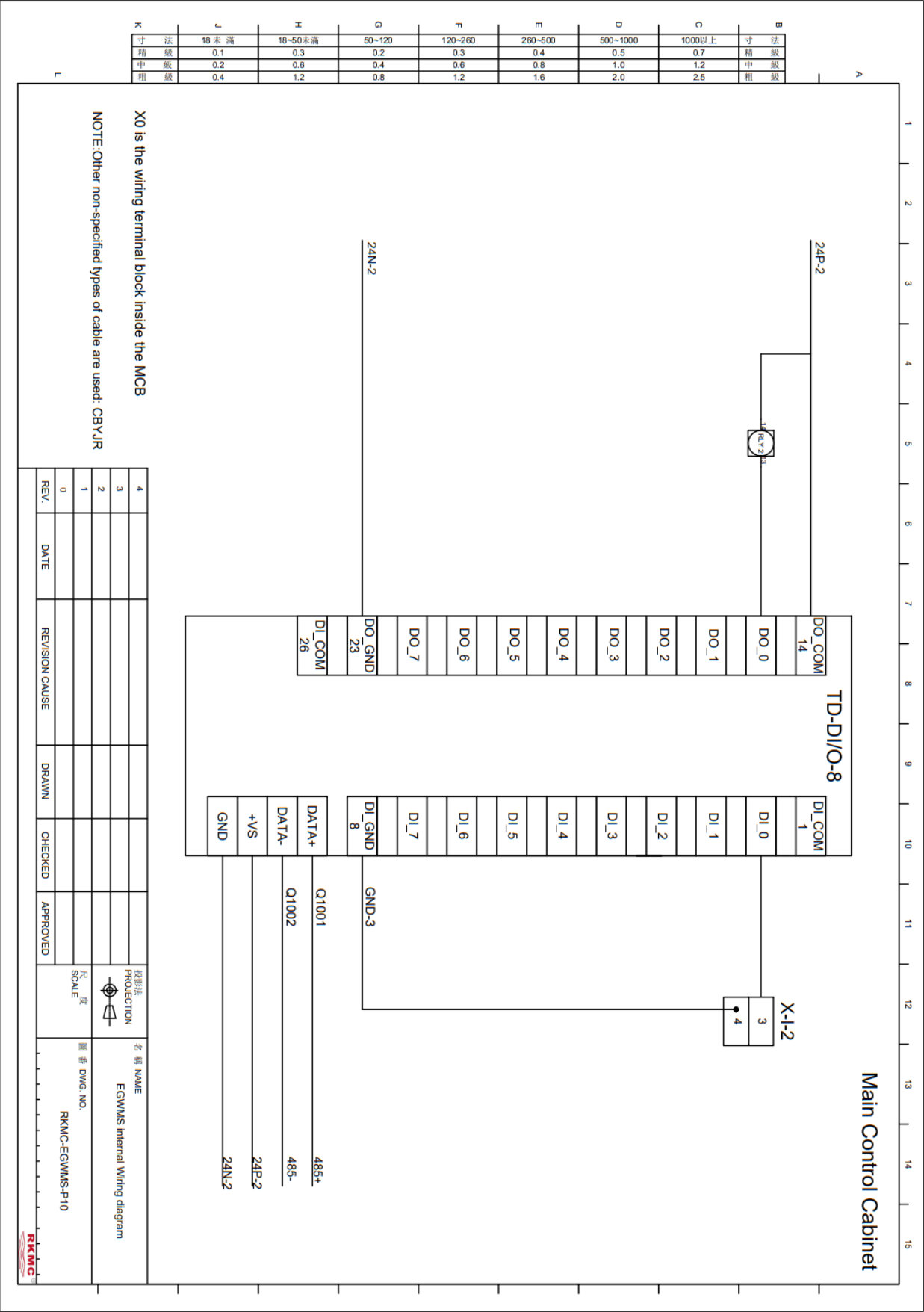
A	尺寸法	粗
B	尺寸法	精
C	1000以上	0.7 1.2 2.5
D	500~1000	0.5 1.0 2.0
E	260~500	0.4 0.8 1.6
F	120~260	0.3 0.6 1.2
G	50~120	0.2 0.4 0.8
H	18~50未満	0.3 0.6 1.2
J	18未満	0.1 0.2 0.4
K	寸法	精 中 粗

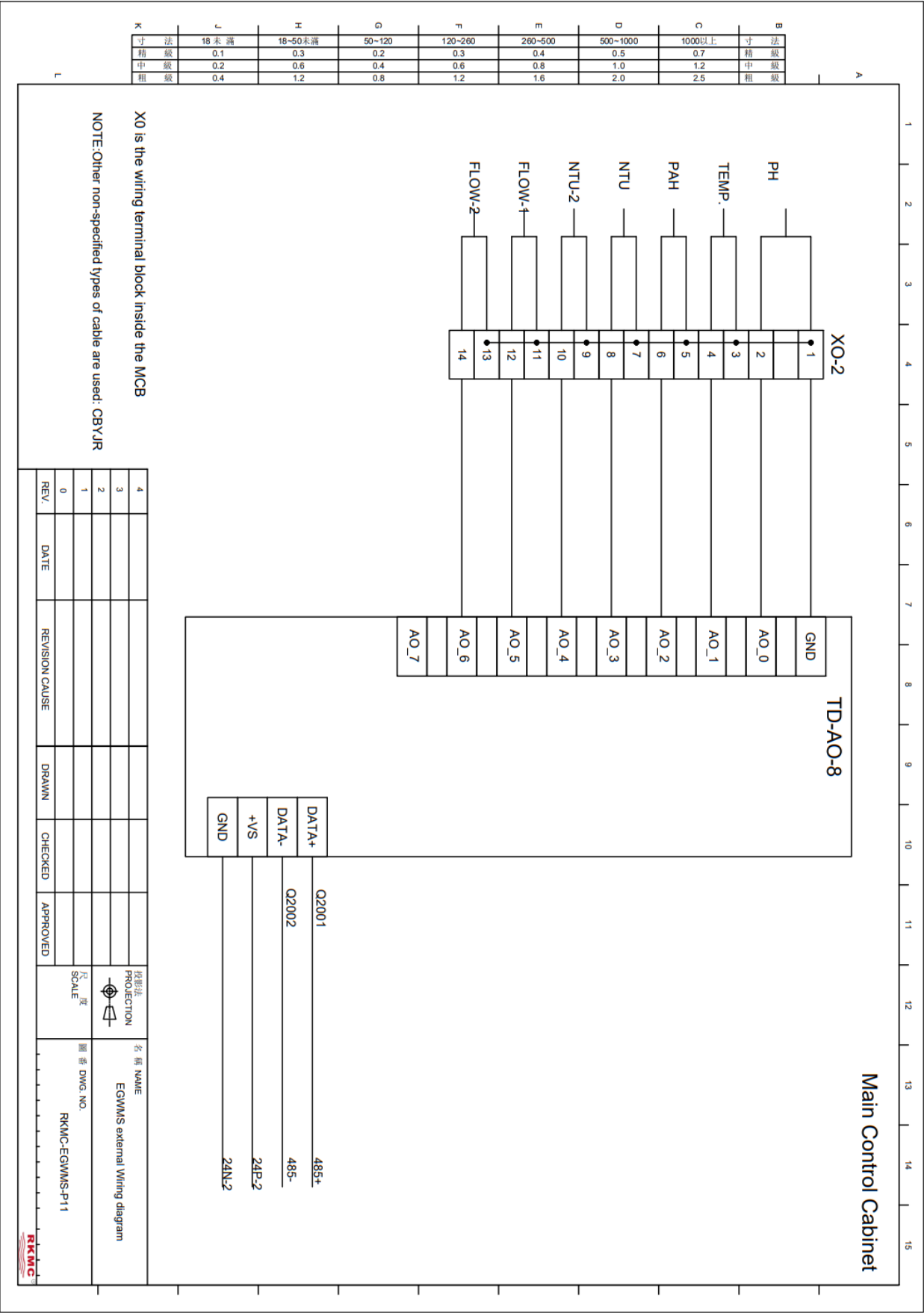
NOTE: Other non-specified types of cable are used: CBYJR

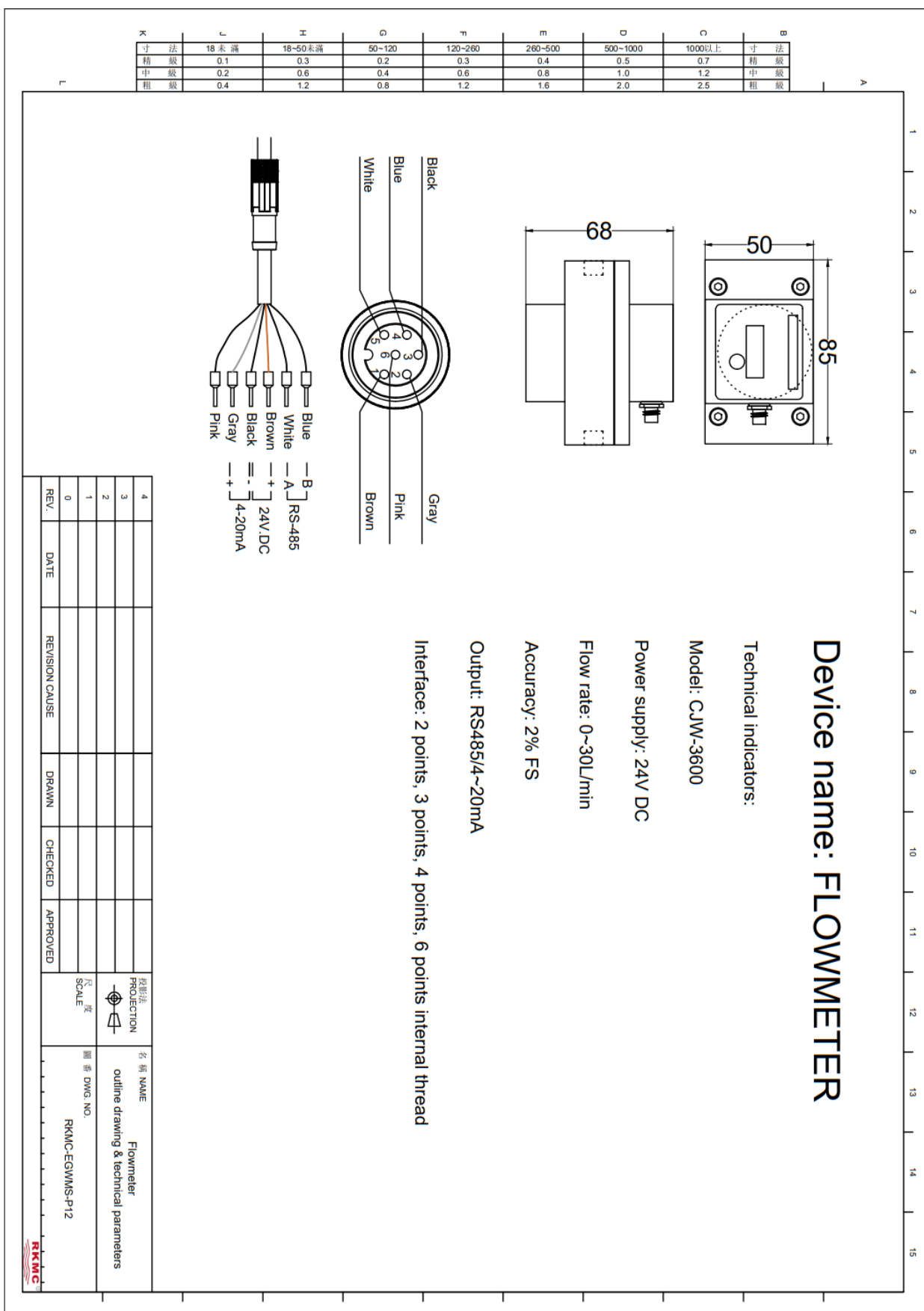
4						投影法 PROJECTION	名稱 NAME
3						TD-AO-8 Wiring diagram & technical parameters	
2							
1							
0							
REV.	DATE	REVISION CAUSE	DRAWN	CHECKED	APPROVED	圖章 DWG. NO. RKMC-EGWMS-P7	

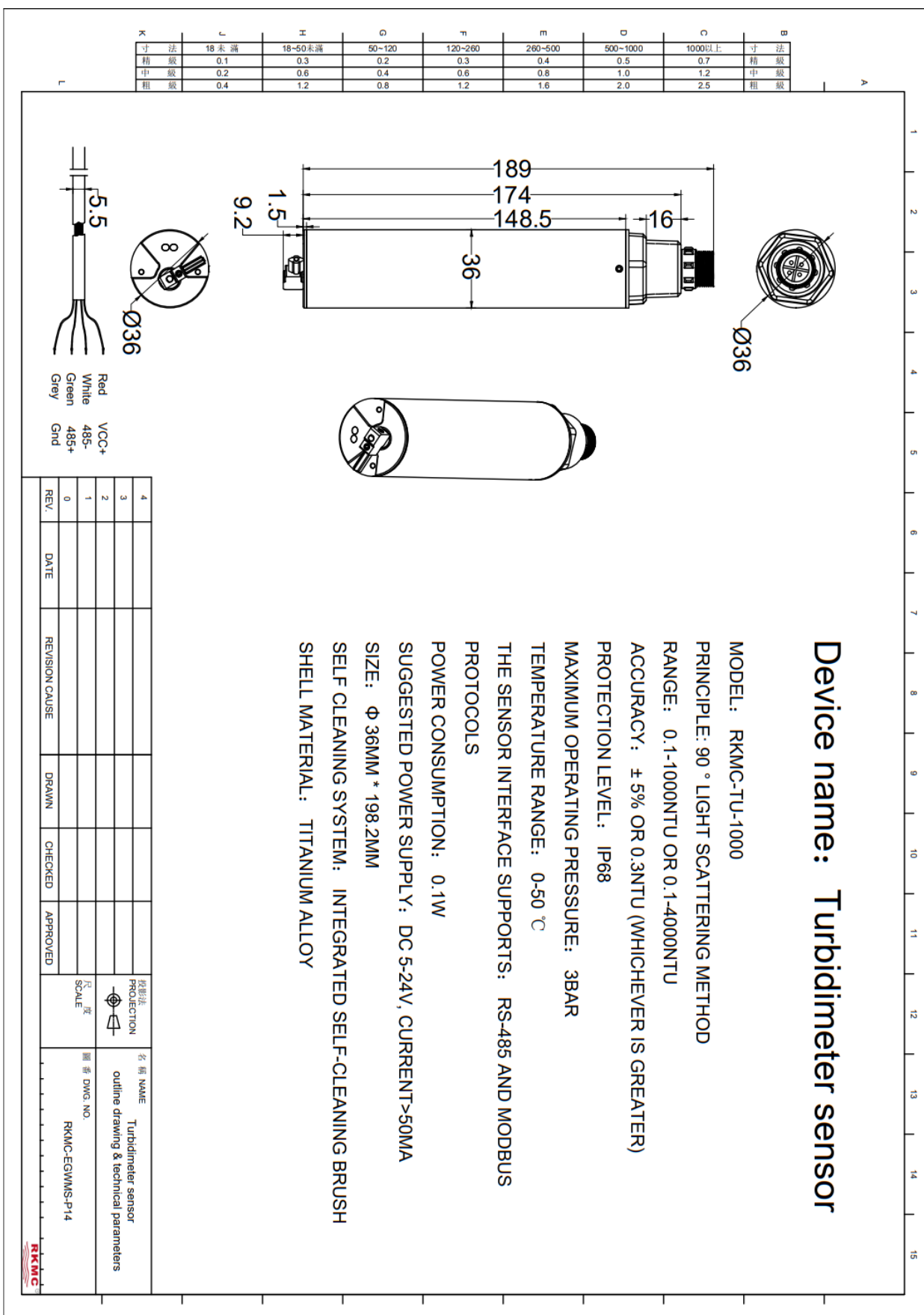


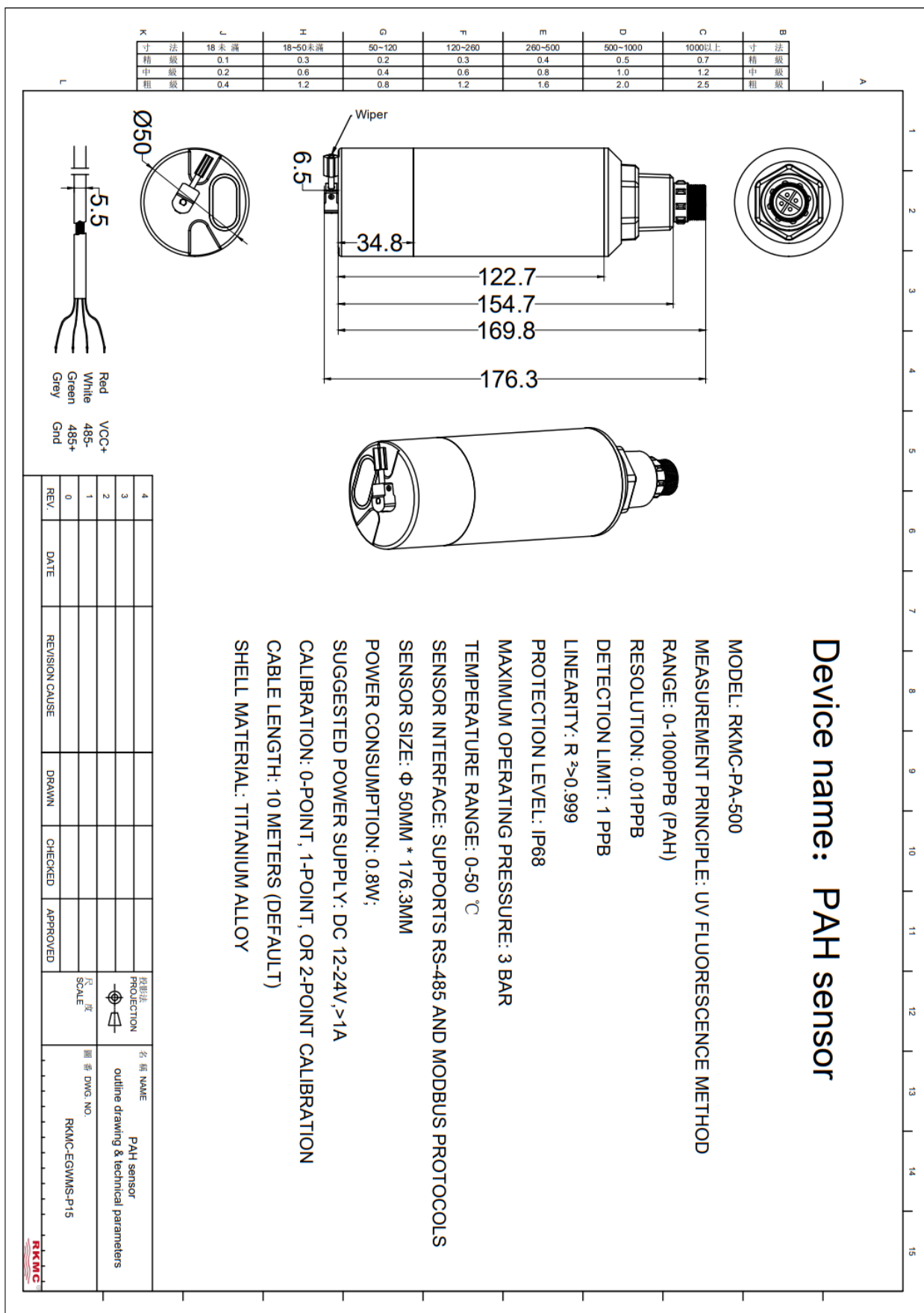


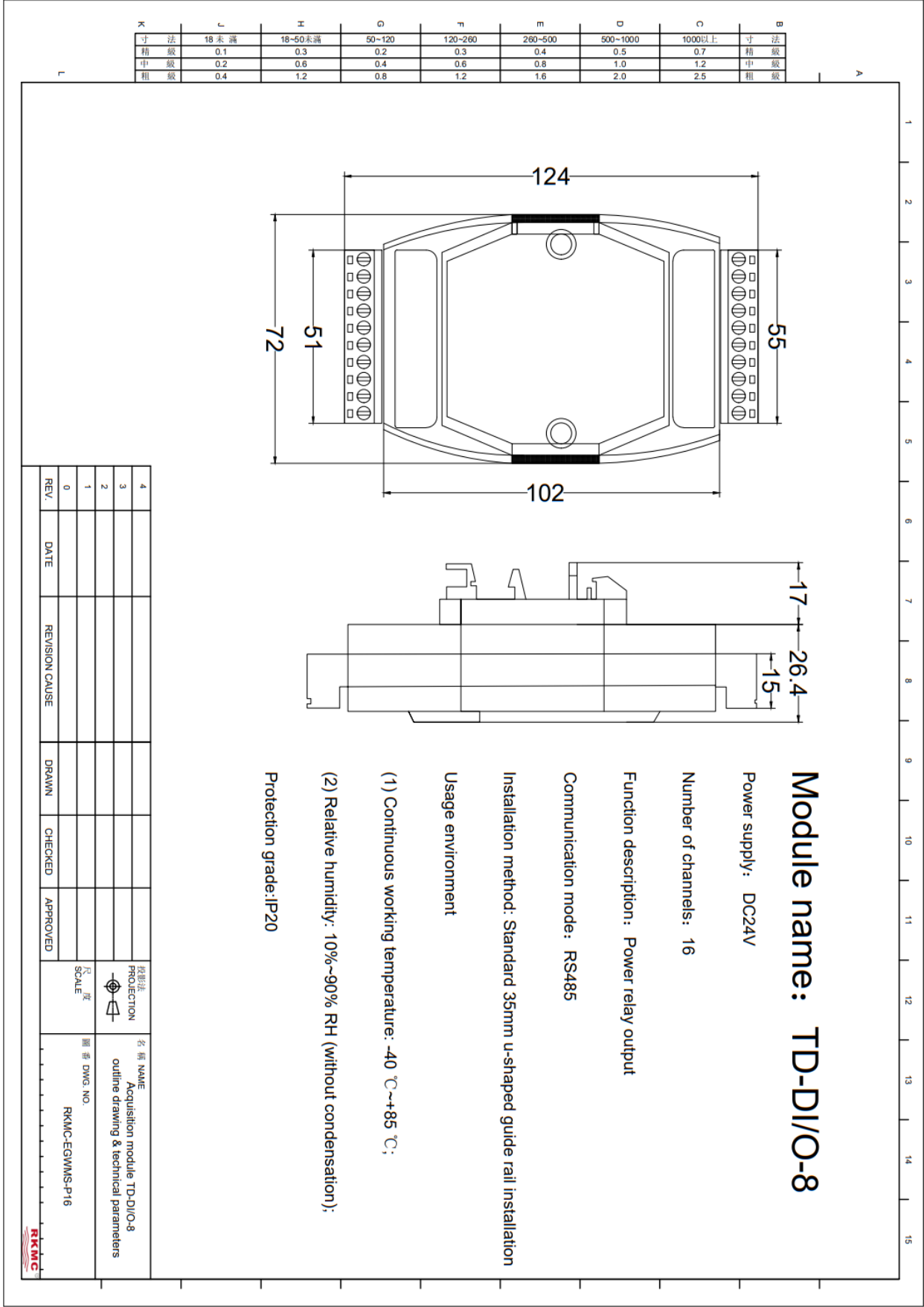


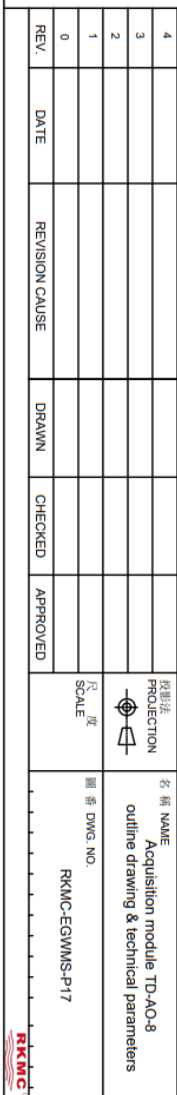




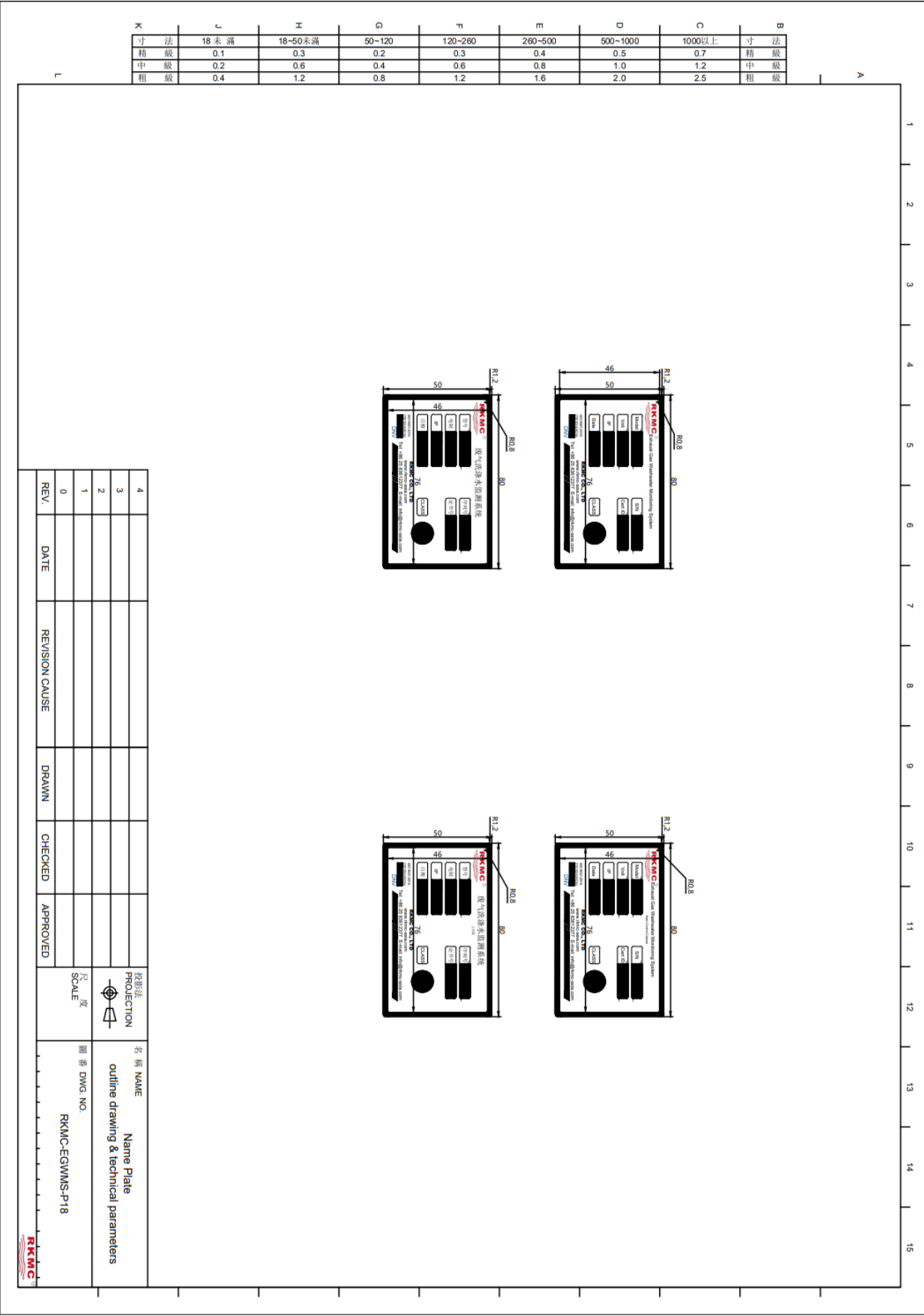


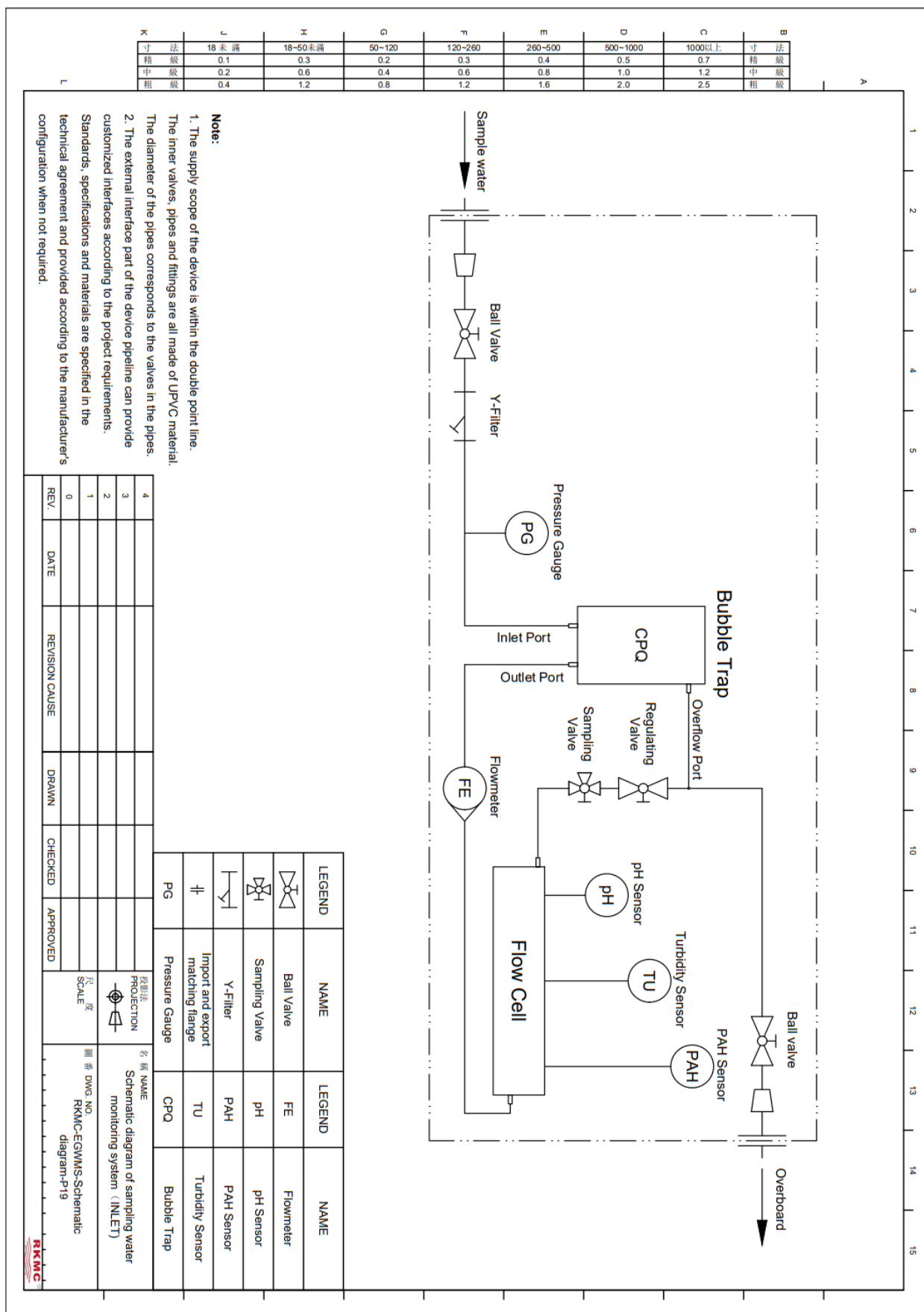


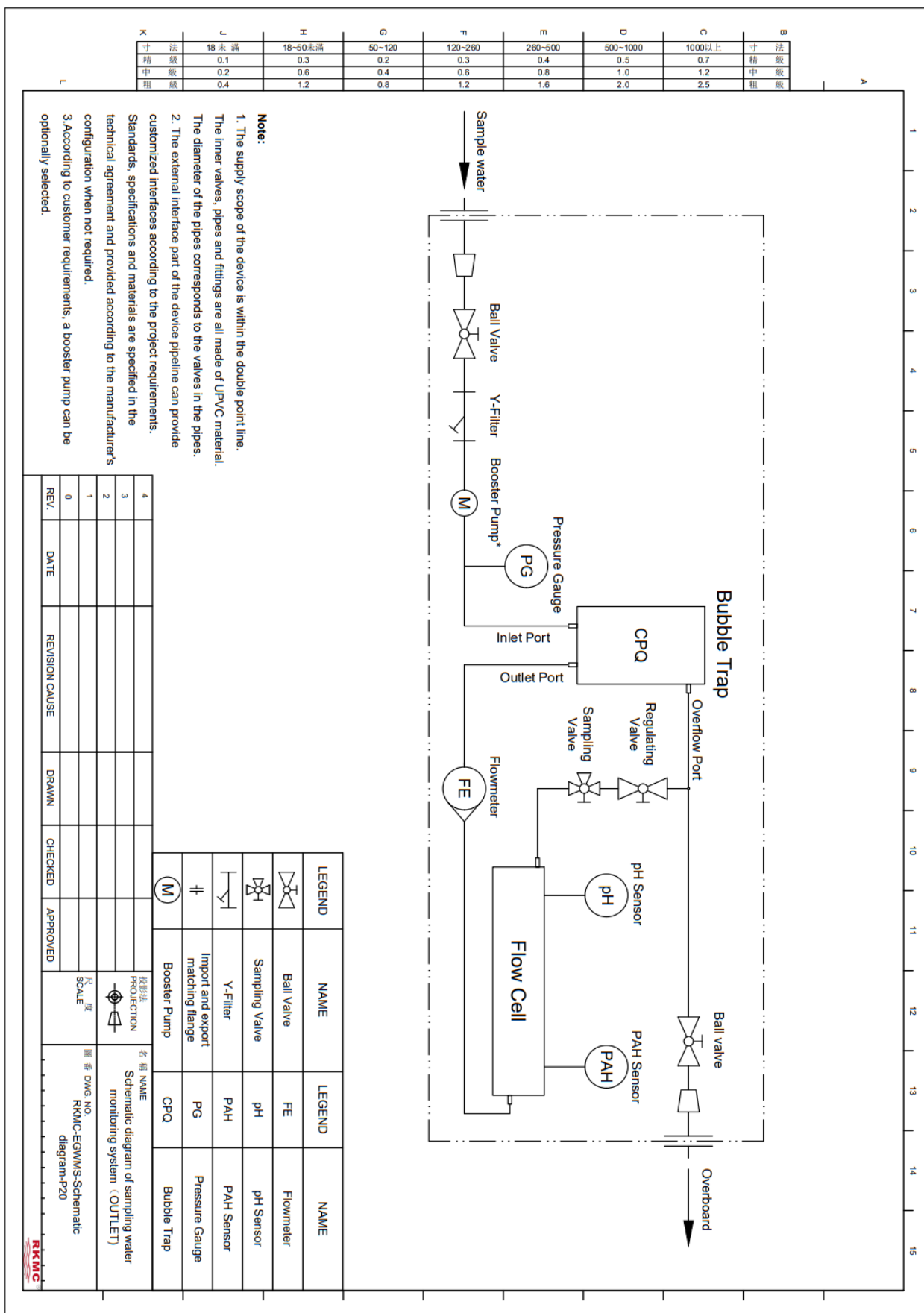


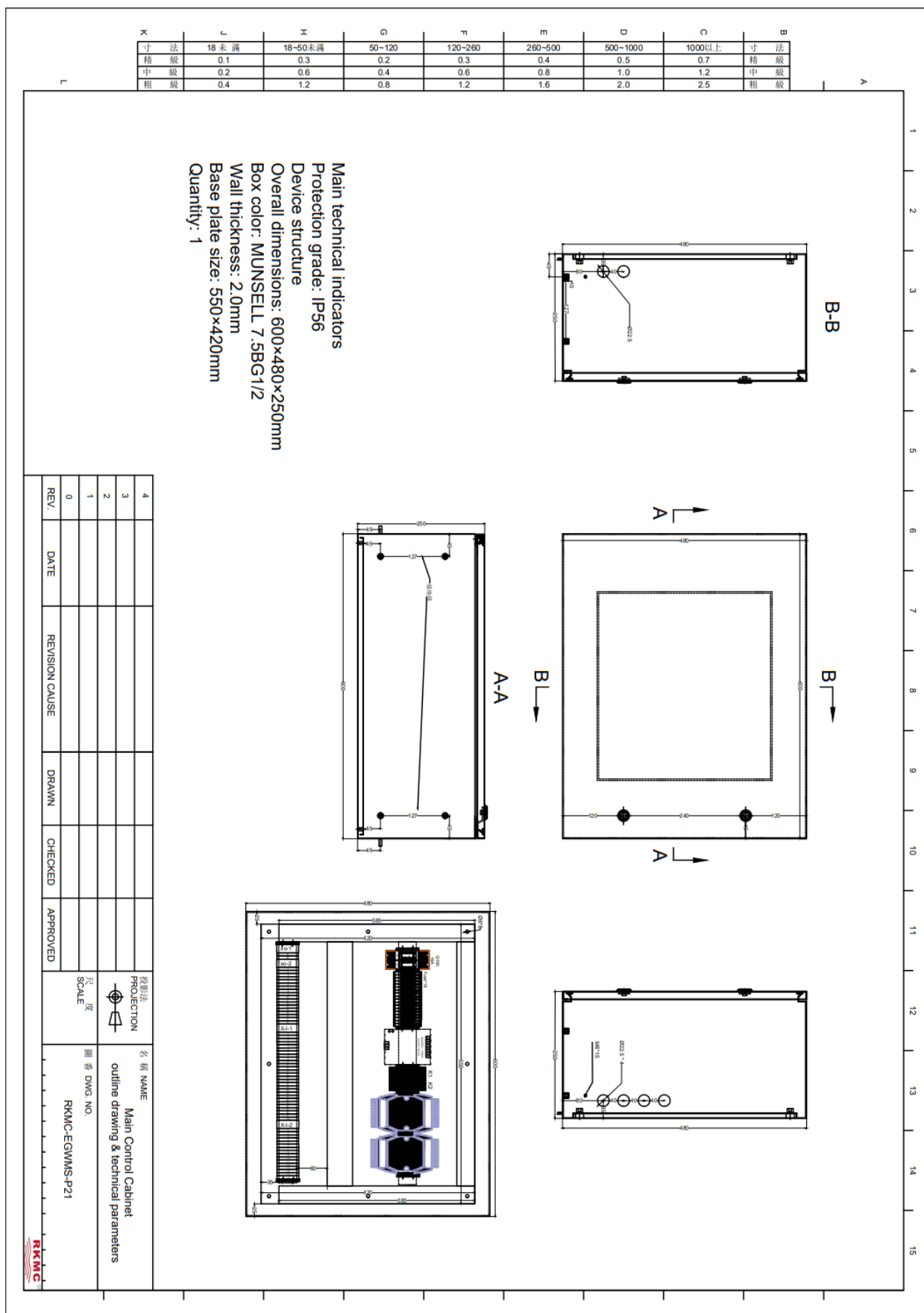


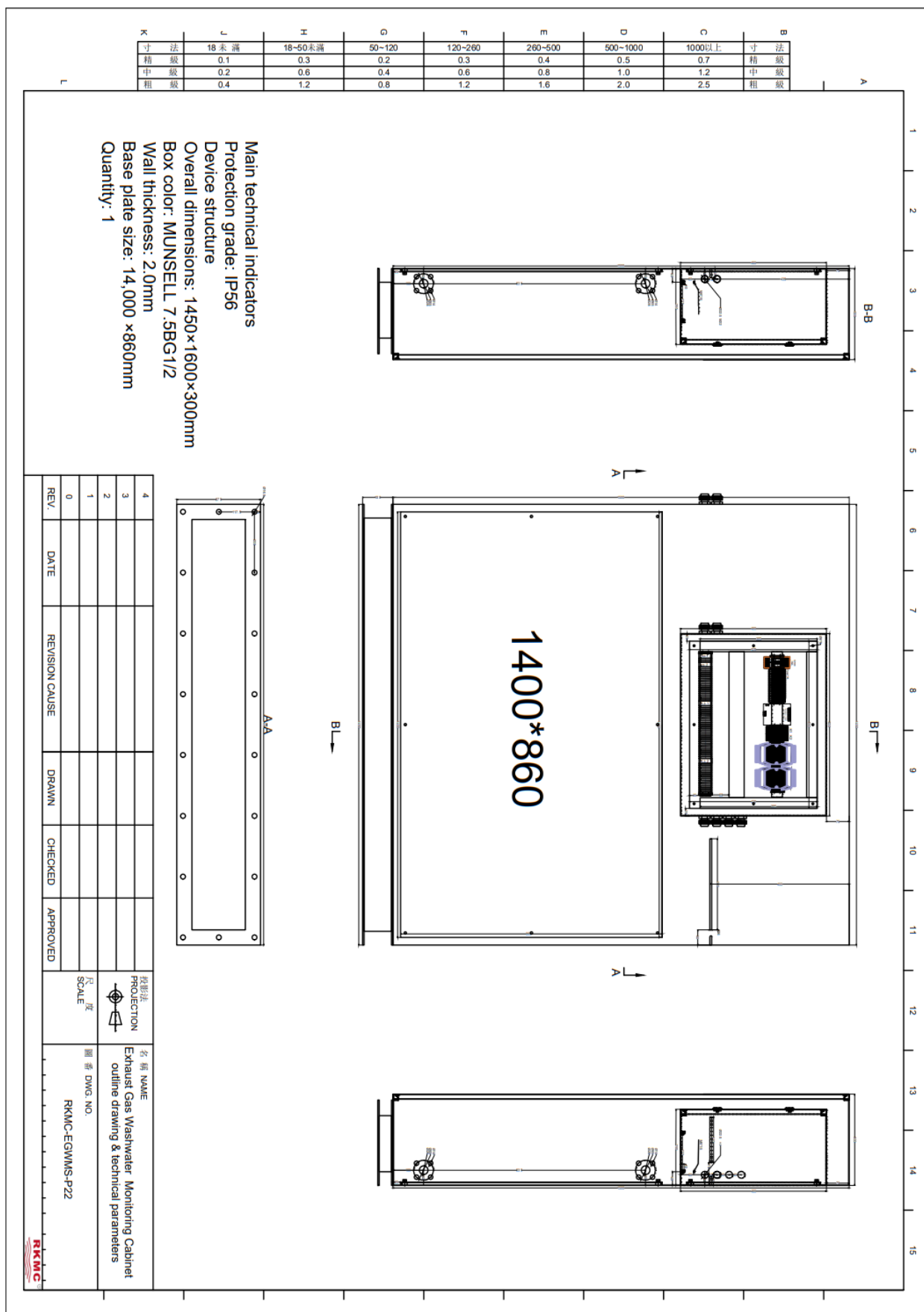
Protection grade: IP20











3 Transportation and installation

3-1 Scope

This document aims to inform how to transport, lift, store, and install the exhaust gas washing water monitoring system before debugging/starting the system.

The purpose is to prevent personnel injury and equipment damage.

3-2 Packaging

The packaging has been considered based on weight, size, and agreed specifications with the customer to protect the equipment from transportation damage, such as moisture resistance, corrosion resistance, rain resistance, and normal handling impact, to ensure delivery is not damaged, etc. Usually, custom-made wooden boxes are used. Each item should be packed in a box to ensure safe transportation.

To avoid damage, the equipment must be protected with cardboard or other materials before packaging.

The supporting weight of the case body must be considered to withstand impacts caused by transportation. Inside the chassis, sturdy brackets must be used to secure the equipment to vibrations during transportation.

The shape of the box must be suitable for lifting or moving with other tools. For this purpose, a fixing ring should be installed on the vehicle body and a fork groove should be added at the bottom of the watch case.

The packaging list including the name, model, specifications, etc. of the goods must be clearly fixed on the surface of the box for future inspection and acceptance.

3-3 Transportation

The packaging will protect the equipment during normal transportation and handling. Transportation may be by truck, train, or ship. The boxes should be secured with ropes to prevent shaking during transportation. The best method is to put the box into the hanging cage when lifting it on the ship to avoid it falling off the lock buckle.

After the goods arrive, they should be carefully transited. Regardless of the mode of transportation, normal preventive measures regarding packaging safety fastening/anchoring should be taken.

Note:

1. Vertical transportation;

2. Keep dry;
3. Handle with care;
4. Unpackaged transportation is not accepted, but short distance transportation within the installation area is allowed without packaging;
5. Each packaging box should be accompanied by a packing list;

3-4 Lifting and transportation

Only certified lifting equipment can be used for lifting.

Lifting should be done by using lifting straps through the lifting ears on the cabinet. But special attention should be paid to avoid damaging the equipment.

The packaging box is convenient for forklift transportation.

Attention: Consider the center of gravity and ensure that the unit is fully secured. Before starting the lifting operation; Check whether the equipment is properly tied relative to the center of gravity through "test lifting".

Lifting should be carried out slowly and carefully.

3-5 Storage

It is recommended to store all equipment in a dry warehouse without removing the original packaging.

It is not recommended to use an outdoor storage location.

3-6 Installation

Maintain sufficient installation and maintenance space and avoid exposure to extreme temperatures. The device should be firmly fixed on the deck. Suggest using a chassis welded to the deck. The bolt connection size is displayed on the dimension diagram (see figure number ____). Please also refer to drawing number ____ for stabilizing the position space.

3-6-1 Connection of washing water pipeline

Attention: All pipe cutting should be completed by a pipe cutting machine, and any burrs or edges should be removed. Never use a steel saw. It is crucial that the pipe end remains sealed until the connection is completed.

The size of the pipeline should be related to the required flow rate, and it is recommended to use a DN20 pipeline. The wiring of pipelines should avoid unnecessary bends and "air pockets", and minimize the possibility of bubble generation as much as possible.

It is crucial to keep the pipe end sealed before completing the connection of the pipeline.

Good quality pipeline fittings or flanges should be used, and the materials in the fittings/flanges should be selected to be suitable for the materials in the pipeline. All pipelines should be flushed before connecting to the system.

3-6-2 Cable/Wiring Connections

All cables/wiring should be connected to the terminals in the device according to the system wiring diagram, and wiring should be operated according to relevant regulations.

All cables/wiring should be connected to the terminals in the control cabinet according to the wiring diagram. Wiring should be carried out correctly according to relevant requirements and regulations.

Wiring diagram, please refer to the working drawing.

3-7 Save after installation

After installation, check if all connection points are properly sealed.

The equipment should be protected from potential damage caused by other work carried out in the same installation area, such as sandblasting, painting, spraying water cleaning, etc.

3-8 Limitation of liability

RKMC Co., Ltd. is not responsible for the following damages:

- ◆ Equipment damage caused by careless handling and transportation.
- ◆ Equipment damage/malfunction caused by neglecting the product manual and preventive measures of RKMC Co., Ltd.
- ◆ Accidents/damages caused by the use of unverified lifting equipment.
- ◆ Accidents caused by neglecting RKMC's instructions and preventive measures.

4 Debugging/startup of washing water monitoring system

4-1 Scope

This document aims to provide a general description of the startup of the washing water monitoring system. Debugging/start-up should be carried out by qualified personnel with the necessary knowledge and experience of washing water monitoring systems.

4-2 Files required for debugging and startup

The following project documents are required to perform this task:

- ✧ List of parameters for the washing water monitoring system (if needed)
- ✧ Principle/block diagram of washing water monitoring system (if necessary)
- ✧ Electrical wiring diagram of washing water monitoring system

4-3 General inspection before starting/adjusting

Before starting the washing water monitoring system, the following checks must be performed:

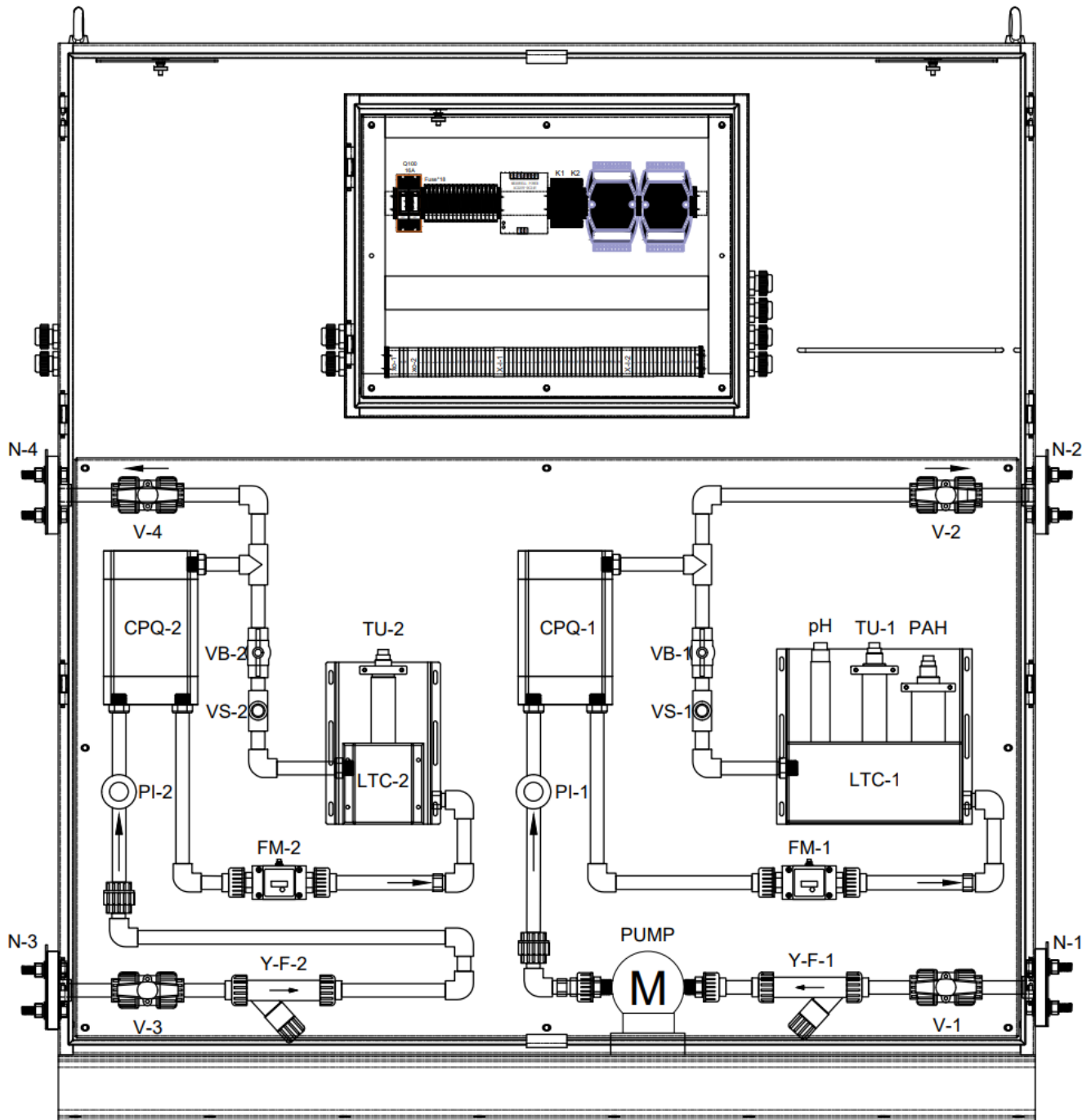
- ✧ Check all external electrical and piping connections. The power supply voltage on external cables/wires should be measured according to the project documents.
- ✧ Tighten all internal pipe connections to ensure they are not loose during transportation and installation.
- ✧ Check if the external connecting pipelines are properly connected and if the connecting flanges of the system are securely fastened.
- ✧ Has the flange blind plate in the pipeline entering the system been removed.
- ✧ The temperature of the sampled water entering the system shall not exceed 50 °C.

4-4 Start/Adjust

- A. Install the pH sensor and fill the system with water within 30 minutes after installation.
- B. Open the inlet valves of V1 and V3 and check for any leakage inside the system.
- C. Open the outlet valves of V2 and V4 and wait for about 2 minutes. This step is very important.

D. Open the VB-1 and VB-2 regulating valves and allow the internal management of the system to fully cycle. Wait for about 2 minutes.

E. Open the sampling valve and observe if there is any water flowing out. Note that a small bucket or bottle can be used to connect the water here to avoid water splashing and causing pollution. Observe whether there are visible bubbles in the flowing water, and close the sampling valve when there are no obvious bubbles.



Symbol Name Description

NO	Symbol Name	Part number	Part Name	Description
1	N1	RKMC-FL-DN25	Flange	UPVC DN25, EGC Water Inlet
2	N2	RKMC-FL-DN25	Flange	UPVC DN25, EGC Water Outlet
3	N3	RKMC-FL-DN25	Flange	UPVC DN25, Seawater Inlet
4	N4	RKMC-FL-DN25	Flange	UPVC DN25, Seawater Outlet
5	PH	RKMC-PT-02	PH sensor	DC24V RS485
6	PAH	RKMC-PA-500	PAH sensor	DC24V RS485
7	TU-1 / TU-2	RKMC-TU-1000	Turbidimeter	DC24V RS485
8	FM-1 / FM-2	RKMC-FM-01	flow meter	DC24V RS485
9	CPQ-1 / CPQ-2	RKMC-CPQ-01	Defoamer	UPVC G1/4
10	LTC-1	RKMC-LTC-01	liquidity pool	UPVC G1/4
11	LTC-2	RKMC-LTC-02	liquidity pool	UPVC G1/4
12	PUMP	RKMC-BP-01	diaphragm pump	DC24V
13	Y-F-1 / Y-F-2	RKMC-YTF-01	Y-shaped filter	UPVC DN15
14	PI-1 / P1-2	RKMC-YN60Z-16	Pressure gauge	1.6 Mpa
15	V1 / V2 / V3 / V4	RKMC-UPV-1	UPVC Ball Valve	UPVC DN20
16	VB-1 / VB-2	RKMC-UPV-VB	UPVC Adjust Valve	UPVC DN20
17	VS-1 / VS-2	RKMC-UPV-VS	UPVC Sampling Valve	UPVC G 3/4

4-5 System power on

After completing the above steps, open the electrical control box on the upper part of the system enclosure and close the switch. After about 30 seconds, the system will automatically start and check if the relevant parameters are normal.

4-6 Document

All results of the above work should be recorded in the RKMC debugging report.

This document should be verified and signed by the commissioning engineer and the shipyard or shipowner representative.

5 Operation and maintenance of washing water monitoring system

5-1 Scope

This section will provide an overview of the operation, maintenance, and troubleshooting of the washing water monitoring system.

5-2 System operation

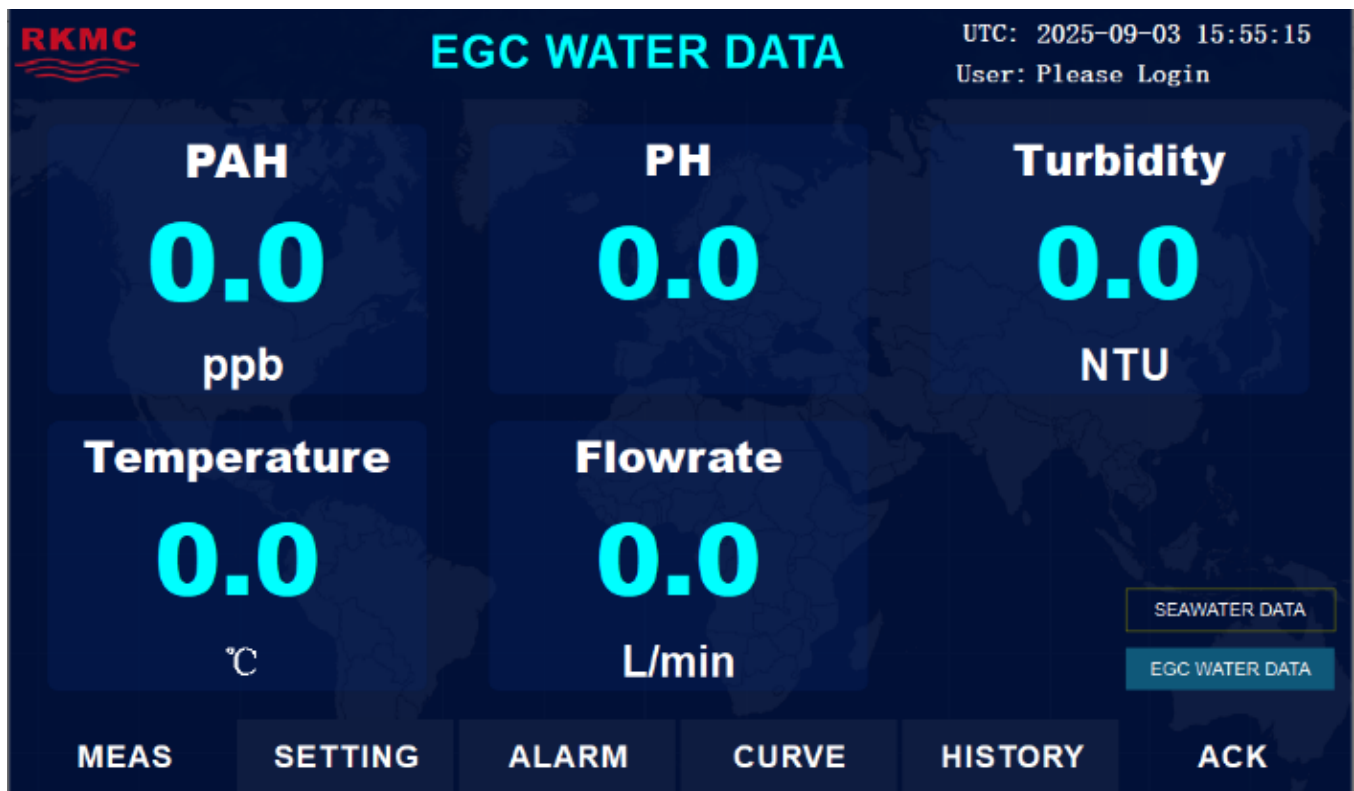
After completing all the preparatory work, the system will be powered on and the industrial control screen will light up and automatically run, entering the main interface. The UTC time and user login status will be displayed in the upper right part of this interface.

The main interface displays the monitored data: PAH, pH, turbidity value, temperature, and flow rate value.

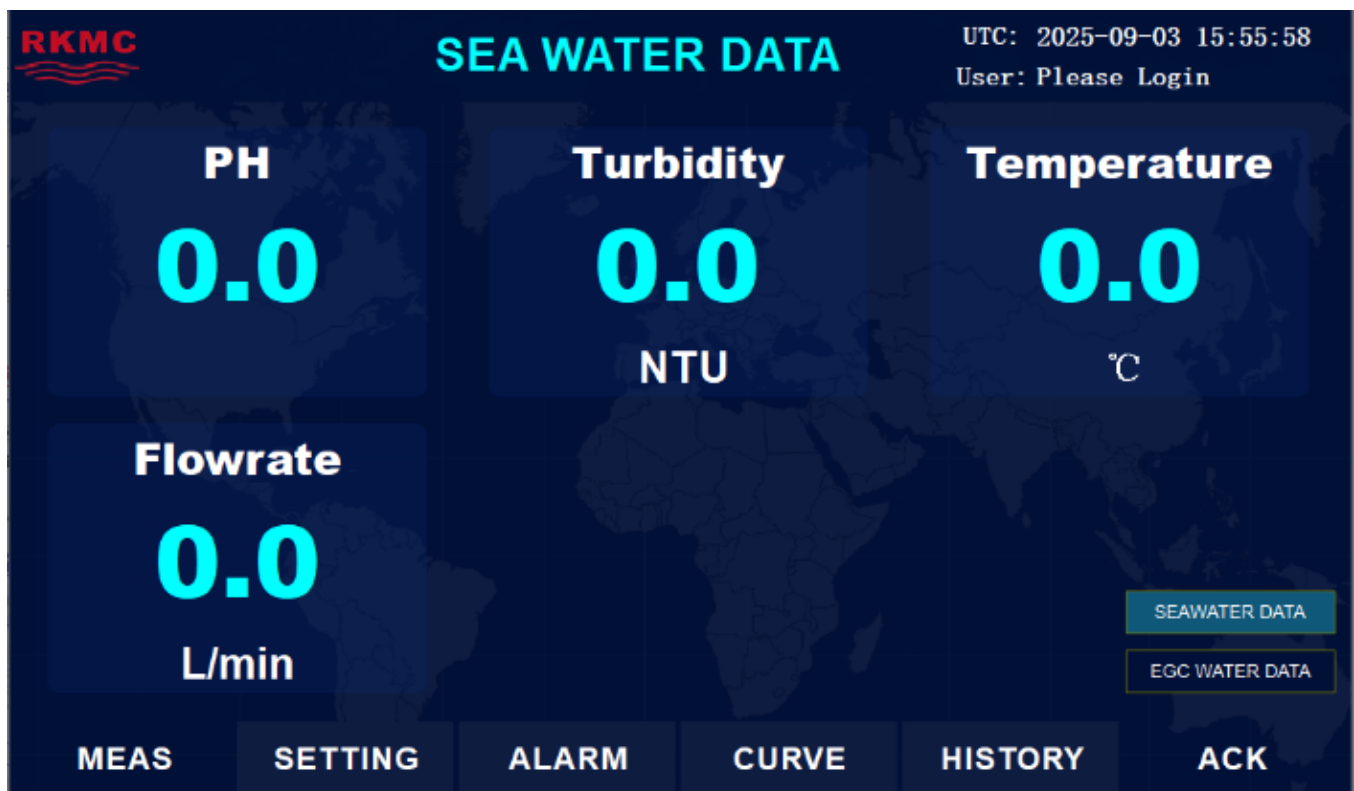
The bottom menu includes the MEAS, SETTING, ALARM, CURVE, STORY, and ACK function buttons.

There is a system data selection button in the lower right part of the interface, and SEAWATER DATA is the sampling and monitoring system data for the washing water inlet; EGC WATER DATA is the data from the washing water outlet water sampling and monitoring system.

Click the button to select the corresponding system data interface.



Data interface of the washing water inlet sampling monitoring system:



System user login window

When clicking the Please Login button, the system will pop up a login dialog box. Enter the pre graded account and password, and the user can log in to the system to perform corresponding functional operations.

The account permissions have been initially set or graded according to customer requirements, and different accounts have different operational permissions.

The screenshot displays the 'SEA WATER DATA' monitoring interface. At the top left is the 'RKMC' logo. The title 'SEA WATER DATA' is centered at the top in large cyan letters. The top right corner shows the UTC time '2025-09-03 15:58:47' and the status 'User: Please Login'. The main display area is divided into three sections: 'PH' with a value of '0.0', 'Turbidity' with a value of '0.0', and 'Temperature' with a value of '0.0' and a unit '°C'. Below the 'PH' section, the label 'Flowrat' is partially visible, followed by a large '0.0' and the unit 'L/min'. A 'USER LOGIN' dialog box is centered on the screen, featuring input fields for 'USER:' (containing 'operator11') and 'PWD:' (containing '*****'). Below these fields are three buttons: 'LOGIN', 'LOGOUT', and 'LOST PWD'. The dialog box has a close button 'X' in the top right corner. At the bottom right of the main interface, there are two buttons: 'SEAWATER DATA' and 'EGC WATER DATA'. The bottom of the screen features a navigation bar with six buttons: 'MEAS', 'SETTING', 'ALARM', 'CURVE', 'HISTORY', and 'ACK'.

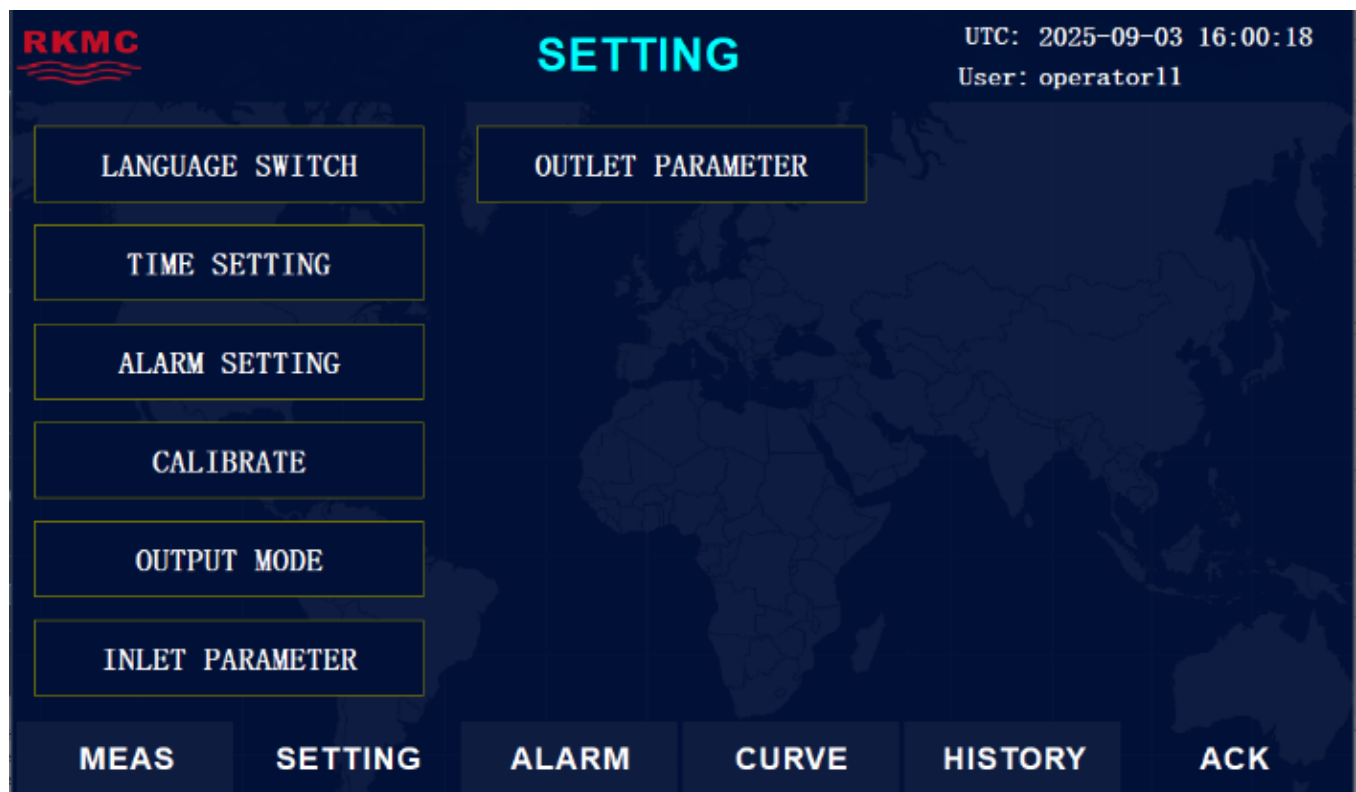
Setting interface

Click the "Setting" button in the menu bar at the bottom of the interface to enter the system settings interface. On this interface, users can select the corresponding options to modify settings as needed. The electrical MEAS can return to the main interface.

After logging in, usernames with setting permissions can enter the settings interface and execute the function settings displayed in the menu below. Users with different permissions can also perform graded function operations.

In this interface, you can click the corresponding button to perform the following functional operations:

- ✧ Language SWITCH language selection settings
- ✧ Time Setting: Time Adjustment and Time Zone Selection
- ✧ ALARM SETTING Alarm Setting
- ✧ CALIBRATE sensor calibration
- ✧ OUTPUT MODE output mode
- ✧ INLET Parametric input data
- ✧ OUTLET Parametric Output Data



Language setup

Click the Language SWITCH button to enter the language settings dialog box. This system provides operation interfaces in both Chinese and English languages. Users can click on the corresponding language button to select the corresponding language operation interface.



Time setup

Click the TIME SETTING button to enter the time setting dialog box, click the corresponding box to enter the time that needs to be adjusted to complete the time setting.

The screenshot displays the RKMC SETTING interface. At the top left is the RKMC logo. The title 'SETTING' is centered at the top in large blue letters. On the top right, the UTC time '2025-09-03 16:01:05' and the user 'operator11' are shown. A vertical menu on the left contains buttons for 'LANGUAGE SWITCH', 'TIME SETTING', 'ALARM SETTING', 'CALIBRATE', 'OUTPUT MODE', and 'INLET PARAMETER'. The 'TIME SETTING' button is highlighted. A 'TIME SETUP' dialog box is open in the center, featuring a close button (X) in the top right corner. The dialog contains two rows of input fields: the first row for 'YY', 'MM', and 'DD' (each with a '0' in the input box), and the second row for 'H', 'M', and 'S' (each with a '0' in the input box). An 'AFFIRM' button is located at the bottom of the dialog. At the bottom of the main interface, a horizontal menu includes buttons for 'MEAS', 'SETTING', 'ALARM', 'CURVE', 'HISTORY', and 'ACK', with 'SETTING' being the active selection.

Alarm setting

Click the ALARM SETTING button to enter the alarm settings dialog box

Alarm thresholds for monitoring data such as PAH, pH, temperature, turbidity, and flow rate can be set as needed;

Alarm delay for monitoring points can be set.

Click on the numerical display box and enter the numerical value to complete the setting.



ALARM SETTING

UTC: 2025-09-03 16:01:33
 User: operator11

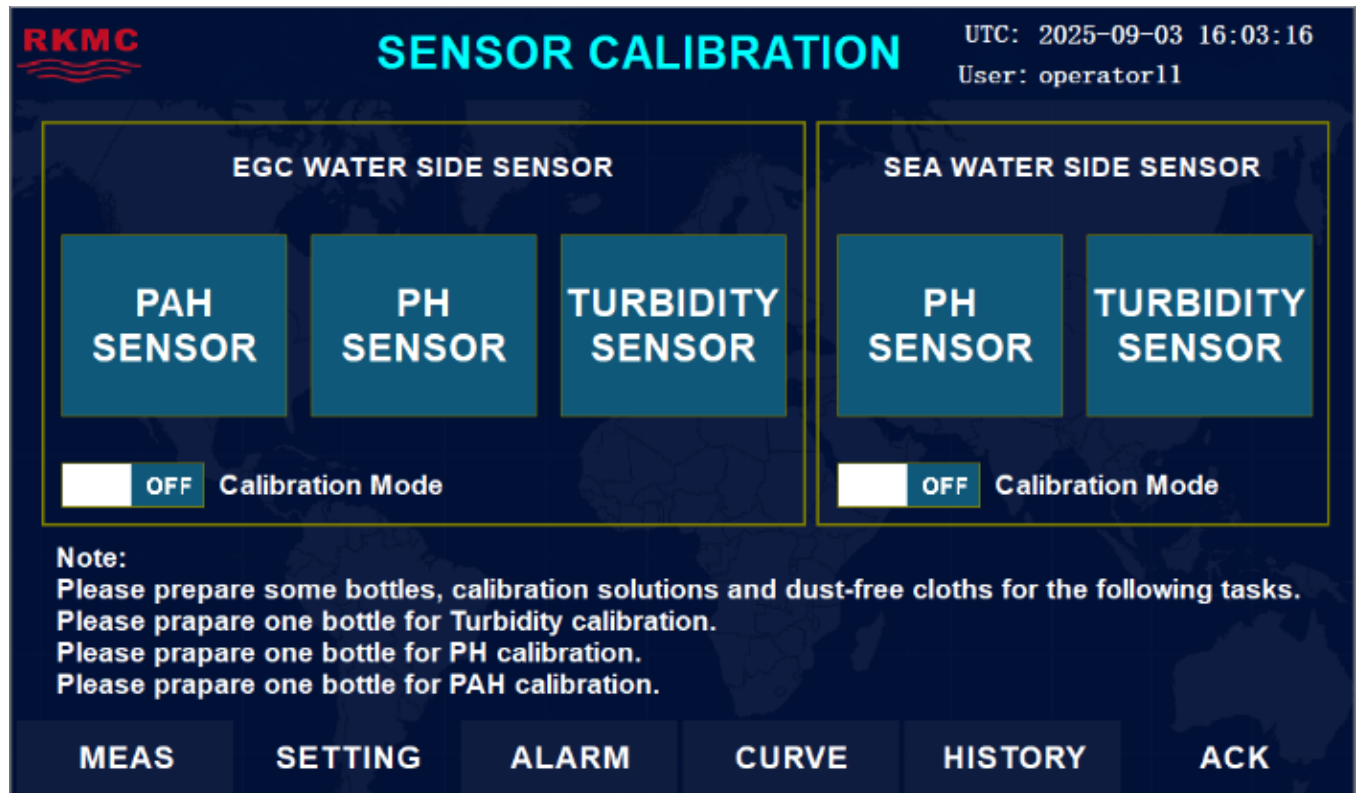
SEA WATER SIDE				
PH	DelayTime	0	S	AlarmThreshold 0.0 pH
Temperature	DelayTime	0	S	AlarmThreshold 0.0 ℃
Turbidity	DelayTime	0	S	AlarmThreshold 0.0 NTU
Flowrate	DelayTime	0	S	AlarmThreshold 0.0 L/min
PH Sensor	DelayTime	0	S	
Turbidity Sensor	DelayTime	0	S	
Flowmeter	DelayTime	0	S	

MEAS
 SETTING
 ALARM
 CURVE
 HISTORY
 ACK

Sensor calibration

Click the CALIBRATE button to enter the sensor calibration interface as shown in the following figure:

The interface displays PAH, PH, and turbidity sensor buttons, and users can click on the corresponding sensor buttons to select the sensor that needs to be calibrated for calibration.



Click the OFF selection button to turn ON and enter calibration mode



SENSOR CALIBRATION

UTC: 2025-09-03 16:03:51
User: operator11

EGC WATER SIDE SENSOR

PAH
SENSOR

PH
SENSOR

TURBIDITY
SENSOR

ON

Calibration Mode

SEA WATER SIDE SENSOR

PH
SENSOR

TURBIDITY
SENSOR

OFF

Calibration Mode

Note:
Please prepare some bottles, calibration solutions and dust-free cloths for the following tasks.
Please prepare one bottle for Turbidity calibration.
Please prepare one bottle for PH calibration.
Please prepare one bottle for PAH calibration.

MEAS

SETTING

ALARM

CURVE

HISTORY

ACK

PAH sensor calibration interface

Follow the steps in the interface to gradually complete the action;

Step 1

1. Immerse the probe into the standard calibration solution.
2. After stabilizing, press the 'Start' button to start the calibration process.

Press the START button

RKMC **SENSOR CALIBRATION** UTC: 2025-09-03 16:04:57
User: operator11

STEP 1	STEP 2	STEP 3
PAH: 0.00 ppb		PAH: 0.00 ppb
1. Immerse the probe into the standard calibration solution.	1. Please rinse the probe with some pure water.	1. Immerse the probe into the standard calibration solution.
2. When stable press the button 'START' to begin the calibration process.	2. Change the standard solution.	2. When stable press the button 'START' to begin the calibration process.
START	CONFIRM	START

PAH 0.00	TEMP. 0.00 °C	Factor(k) 0.00	Offset(b) 0.00
----------	---------------	----------------	----------------

MEAS **SETTING** **ALARM** **CURVE** **HISTORY** **ACK**

Step 2

1. Please rinse the probe with some pure water.

2. Replace the standard solution.

Press the CONFIRM button



SENSOR CALIBRATION

UTC: 2025-09-03 16:05:36
User: operator11

STEP 1

PAH: ppb

1. Immerse the probe into the standard calibration solution.

2. When stable press the button 'START' to begin the calibration process.

START

STEP 2

1. Please rinse the probe with some pure water.

2. Change the standard solution.

CONFIRM

STEP 3

PAH: ppb

1. Immerse the probe into the standard calibration solution.

2. When stable press the button 'START' to begin the calibration process.

START

PAH

TEMP. °C

Factor(k)

Offset(b)

MEAS

SETTING

ALARM

CURVE

HISTORY

ACK

Step 3

1. Immerse the probe into the standard calibration solution.
2. After stabilizing, press the 'Start' button to start the calibration process.

Press the START button

Calibration is completed at each step, and the corresponding step color will change



SENSOR CALIBRATION

UTC: 2025-09-12 14:21:35
User: operator11

STEP 1 PAH: 0.0 ppb 1. Immerse the probe into the standard calibration solution. 2. When stable press the button 'START' to begin the calibration process. START	STEP 2 1. Please rinse the probe with some pure water. 2. Change the standard solution. CONFIRM	STEP 3 PAH: 0.0 ppb 1. Immerse the probe into the standard calibration solution. 2. When stable press the button 'START' to begin the calibration process. START
---	--	---

PAH TEMP. °C Factor(k) Offset(b)

MEASSETTINGALARMCURVEHISTORYACK

pH sensor calibration interface

Follow the steps in the interface to gradually complete the action;

Step 1

1. Immerse the probe into the standard calibration solution.
2. When stable press the button 'START' to begin the calibration process.

Press the START button



SENSOR CALIBRATION

UTC: 2025-09-12 14:29:54
User: operator11

STEP 1 pH: 0.00 1. Immerse the probe into the standard calibration solution. 2. When stable press the button 'START' to begin the calibration process. START	STEP 2 1. Please rinse the probe with some pure water. 2. Change the standard solution. CONFIRM	STEP 3 pH: 0.00 1. Immerse the probe into the standard calibration solution. 2. When stable press the button 'START' to begin the calibration process. START
--	--	--

PH 0.00

TEMP. 0.00 °C

Factor(k) -1.#J

Offset(b) -1.#J

MEAS

SETTING

ALARM

CURVE

HISTORY

ACK

Step 2

1. Please rinse the probe with some pure water.

2. Change the standard solution..

Press the CONFIRM button



SENSOR CALIBRATION

UTC: 2025-09-12 14:27:53
User: operator11

STEP 1

pH: 0.00

1. Immerse the probe into the standard calibration solution.

2. When stable press the button 'START' to begin the calibration process.

START

STEP 2

1. Please rinse the probe with some pure water.

2. Change the standard solution.

CONFIRM

STEP 3

pH: 0.00

1. Immerse the probe into the standard calibration solution.

2. When stable press the button 'START' to begin the calibration process.

START

PH 0.00

TEMP. 0.00 °C

Factor(k) 0.00

Offset(b) 0.00

MEAS

SETTING

ALARM

CURVE

HISTORY

ACK

Step 3

1. Immerse the probe into the standard calibration solution.
2. When stable press the button 'START' to begin the calibration process.

Press the START button

Calibration is completed at each step, and the corresponding step color will change



SENSOR CALIBRATION

UTC: 2025-09-12 14:29:12
User: operator11

STEP 1 pH: 0.00 1. Immerse the probe into the standard calibration solution. 2. When stable press the button 'START' to begin the calibration process. START	STEP 2 1. Please rinse the probe with some pure water. 2. Change the standard solution. CONFIRM	STEP 3 pH: 0.00 1. Immerse the probe into the standard calibration solution. 2. When stable press the button 'START' to begin the calibration process. START
--	--	--

PH 0.00

TEMP. 0.00 °C

Factor(k) -1.#J

Offset(b) -1.#J

MEAS

SETTING

ALARM

CURVE

HISTORY

ACK

Turbidity sensor calibration interface

Follow the steps in the interface to gradually complete the action;

Step 1

1. Immerse the probe into the standard calibration solution.
2. When stable press the button 'START' to begin the calibration process.

Press the START button



SENSOR CALIBRATION

UTC: 2025-09-12 14:33:16
User: operator11

STEP 1

TURB: NTU

1. Immerse the probe into the standard calibration solution.

2. When stable press the button 'START' to begin the calibration process.

START

STEP 2

1. Please rinse the probe with some pure water.

2. Change the standard solution.

CONFIRM

STEP 3

TURB: NTU

1. Immerse the probe into the standard calibration solution.

2. When stable press the button 'START' to begin the calibration process.

START

TURB

TEMP. °C

Factor(k)

Offset(b)

MEAS

SETTING

ALARM

CURVE

HISTORY

ACK

Step 2

1. Please rinse the probe with some pure water.
2. Change the standard solution..

Press the CONFIRM button



SENSOR CALIBRATION

UTC: 2025-09-12 14:33:46
User: operator11

STEP 1

TURB: NTU

1. Immerse the probe into the standard calibration solution.

2. When stable press the button 'START' to begin the calibration process.

START

STEP 2

1. Please rinse the probe with some pure water.

2. Change the standard solution.

CONFIRM

STEP 3

TURB: NTU

1. Immerse the probe into the standard calibration solution.

2. When stable press the button 'START' to begin the calibration process.

START

TURB

TEMP. °C

Factor(k)

Offset(b)

MEAS

SETTING

ALARM

CURVE

HISTORY

ACK

Step 3

1. Immerse the probe into the standard calibration solution.
2. When stable press the button 'START' to begin the calibration process.

Press the START button

Calibration is completed at each step, and the corresponding step color will change



SENSOR CALIBRATION

UTC: 2025-09-12 14:34:11
User: operator11

STEP 1

TURB: NTU

1. Immerse the probe into the standard calibration solution.

2. When stable press the button 'START' to begin the calibration process.

START

STEP 2

1. Please rinse the probe with some pure water.

2. Change the standard solution.

CONFIRM

STEP 3

TURB: NTU

1. Immerse the probe into the standard calibration solution.

2. When stable press the button 'START' to begin the calibration process.

START

TURB

TEMP. °C

Factor(k)

Offset(b)

MEAS

SETTING

ALARM

CURVE

HISTORY

ACK

Output mode setting

Selection of signal output mode in case of power outage (hold/not hold)



OUTPUT MODE SETTING

UTC: 2025-09-03 16:06:13
User: operator11

EGC WATER SIDE		SEA WATER SIDE	
PH Output Signal	III ACTIVE	PH Output Signal	III ACTIVE
PAH Output Signal	III ACTIVE	Turbidity Output Signal	III ACTIVE
Turbidity Output Signal	III ACTIVE	Temature Output Signal	III ACTIVE
Temature Output Signal	III ACTIVE	Flowrate Output Signal	III ACTIVE
Flowrate Output Signal	III ACTIVE		

MEAS

SETTING

ALARM

CURVE

HISTORY

ACK

Search for parameters of seawater side sensor



SETTING

UTC: 2025-09-03 16:07:07
User: operator11

SEA WATER SIDE					
PH Sensor	PH	0.0	pH	Factor(k)	0.00 Offset(b) 0.00
Turbidity Sensor	Tur.	0.0	NTU	Factor(k)	0.00 Offset(b) 0.00
Flowmeter	Flowrate	0.00	L/min	Quantity	0.00 L

MEAS
SETTING
ALARM
CURVE
HISTORY
ACK

Query of sensor parameters on the exhaust gas cleaning system side



SETTING

UTC: 2025-09-03 16:07:37
User: operator11

WASHING WATER SIDE					
PAH Sensor	PAH	0.0	ppb	Factor(k)	-1.#J Offset(b) -1.#J
PH Sensor	PH	0.0	pH	Factor(k)	0.00 Offset(b) 0.00
Turbidity Sensor	Tur.	0.0	NTU	Factor(k)	0.00 Offset(b) 0.00
Flowmeter	Flowrate	0.00	L/min	Quantity	0.00 L

MEAS
SETTING
ALARM
CURVE
HISTORY
ACK

[illegible]

RKMC

SEAWATER HISTORY DATA

UTC: 2025-09-03 16:09:45
User: operator11

NO.	DT	PH	Turbidit (NTU)	Temperatur (°C)	Flowrate (L/min)
1.00	2025-08-25 16:44:04	0.00	0.00	0.00	0.00
2.00	2025-08-25 16:45:04	0.00	0.00	0.00	0.00
3.00	2025-08-25 16:46:04	0.00	0.00	0.00	0.00
4.00	2025-08-25 16:47:04	0.00	0.00	0.00	0.00
5.00	2025-08-25 16:48:04	0.00	0.00	0.00	0.00
6.00	2025-08-25 16:49:04	0.00	0.00	0.00	0.00
7.00	2025-08-25 16:51:26	0.00	0.00	0.00	0.00
8.00	2025-08-25 16:52:26	0.00	0.00	0.00	0.00
9.00	2025-08-25 16:53:26	0.00	0.00	0.00	0.00

< >

Set Time Refresh Export EGC water Data

MEAS SETTING ALARM CURVE HISTORY ACK



SEAWATER HISTORY DATA

UTC: 2025-09-03 16:10:27
User: operator11

NO.	DT	Temp(℃)	Flowrate(L/min)
1.00	2025-08-25 16:44:04		0.00
2.00	2025-08-25 16:45:04		0.00
3.00	2025-08-25 16:46:04		0.00
4.00	2025-08-25 16:47:04		0.00
5.00	2025-08-25 16:48:04		0.00
6.00	2025-08-25 16:49:04		0.00
7.00	2025-08-25 16:51:26		0.00
8.00	2025-08-25 16:52:26	0.00	0.00
9.00	2025-08-25 16:53:26	0.00	0.00

Set time range

☒ All storage data

☐ Recent time

☐ Fixed time

☐ Given time

10

Minutes

Today

Time division point

1

2025

Year

9

Month

3

Day

16

Hour

10

Minute

26

Second

Ok

Cancel

☒ Year

☒ Month

☒ Day

☒ Hour

☒ Minute

☒ Second

Set Time

Refresh

Export

EGC water Data

MEAS

SETTING

ALARM

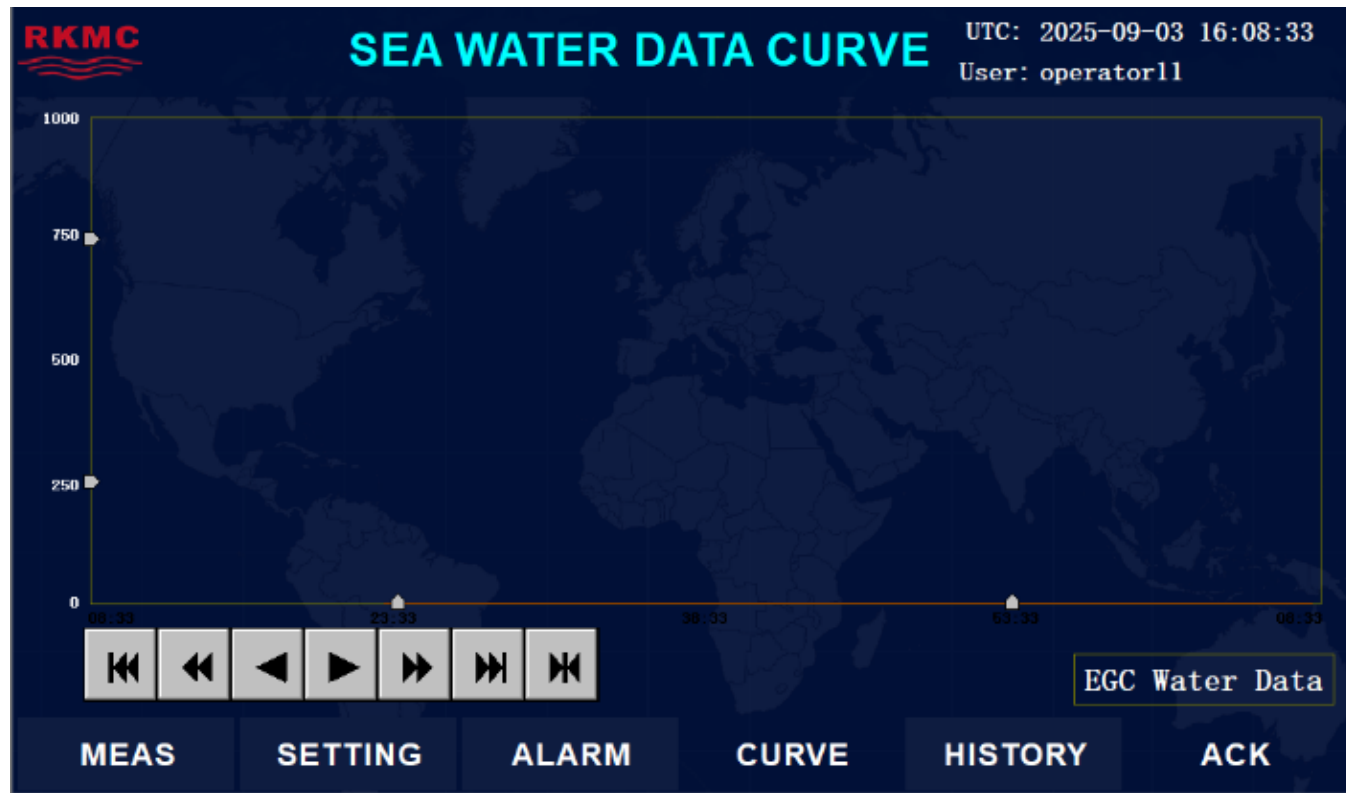
CURVE

HISTORY

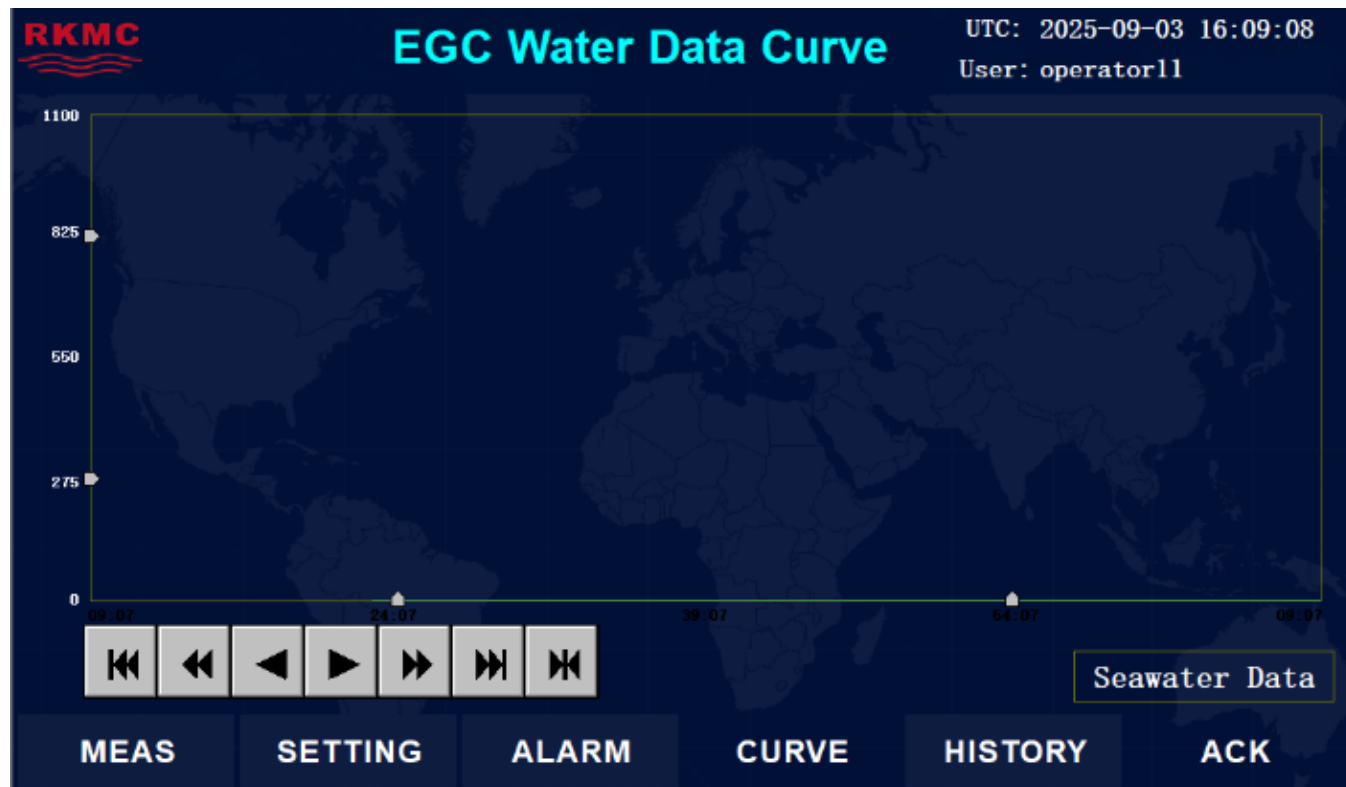
ACK

Historical curve search

Sea water data curve



EGC water data curve



5-3 Troubleshooting

1. Fault phenomenon:

The pH value does not display the measurement result.

Reason for malfunction:

- a. Sensor power supply failure.
- b. Communication malfunction.

Solution:

- a. Check the power supply of the sensor and whether the quick connect plug is securely fastened.
- b. Check if the communication cable is reversed, replace the core wire and rewire it.

2. Fault phenomenon:

The pH value is not displayed and the measurement is too low, too high, or continuously unstable.

Reason for malfunction:

- a. The sensor is severely contaminated.
- b. Electrode aging.
- c. Long term lack of calibration.

Solution:

- a. Clean the sensor body, especially the surface of the light window.
- b. Re calibrate and evaluate whether it is necessary to contact the original factory for replacement.
- c. Calibrate according to the manual.

3. Fault phenomenon:

PAH value does not display measurement results.

Reason for malfunction:

- a. Sensor power supply failure.
- b. Communication malfunction.

Solution:

- a. Check the power supply of the sensor and whether the quick connect plug is securely fastened.
- b. Check if the communication cable is reversed, replace the core wire and rewire it.

4. Fault phenomenon:

PAH value does not display measurement too low, too high, or continuously unstable.

Reason for malfunction:

- a. The sensor is severely contaminated.
- b. Electrode aging.
- c. Long term lack of calibration.

Solution:

- a. Clean the sensor body, especially the surface of the light window.
- b. Re calibrate and evaluate whether it is necessary to contact the original factory for replacement.
- c. Calibrate according to the manual.

5. Fault phenomenon:

The turbidity value does not display the measurement result.

Reason for malfunction:

- a. Sensor power supply failure.
- b. Communication malfunction.

Solution:

- a. Check the power supply of the sensor and whether the quick connect plug is securely fastened.
- b. Check if the communication cable is reversed, replace the core wire and rewire it.

6. Fault phenomenon:

The turbidity value is not displayed and the measurement is too low, too high, or continuously unstable.

Reason for malfunction:

- a. The sensor is severely contaminated.
- b. Electrode aging.
- c. Long term lack of calibration.

Solution:

- a. Clean the sensor body, especially the surface of the light window.
- b. Re calibrate and evaluate whether it is necessary to contact the original factory for replacement.
- c. Calibrate according to the manual.

7. Fault phenomenon:

The flow meter value does not display and the measurement is too low or continuously unstable.

Reason for malfunction:

- a. The rotor is stuck.
- b. The rotor is damaged.

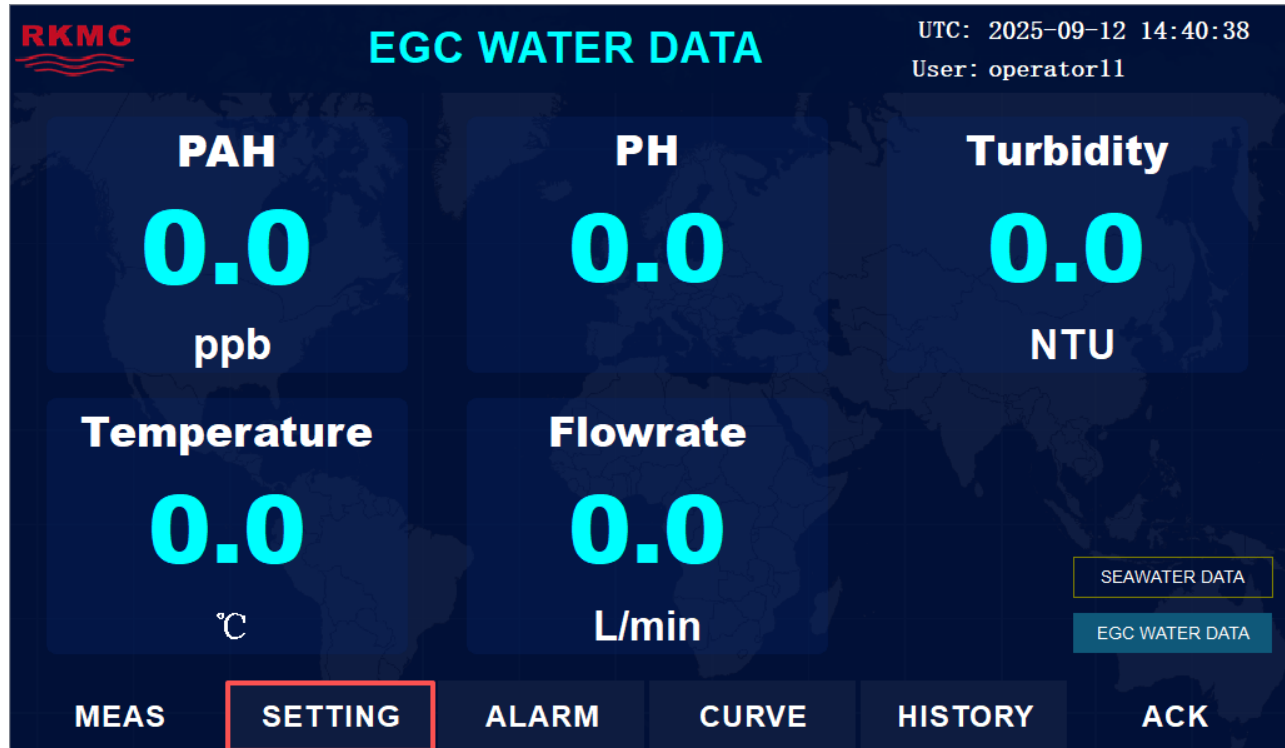
Solution:

- a. Clean the rotor part of the flowmeter and remove any foreign objects.
- b. Replace the original spare rotor.

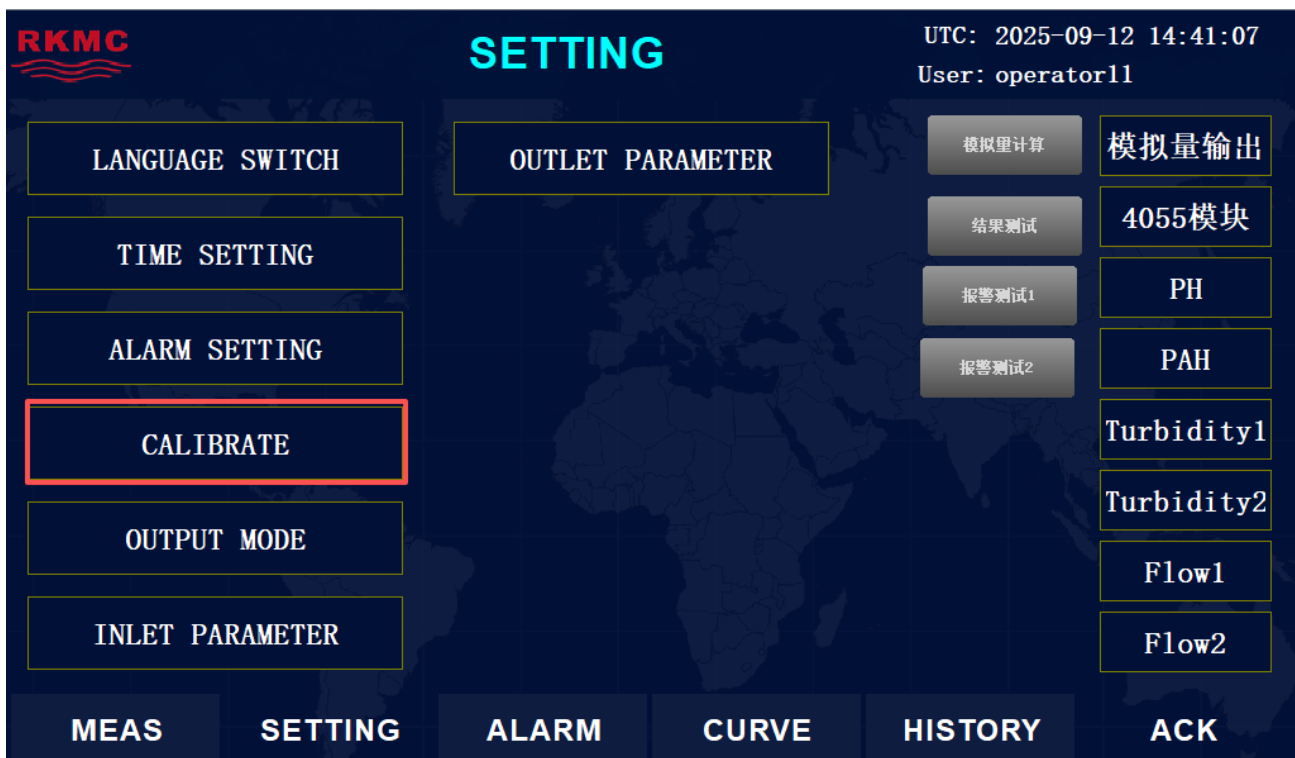
6 On site calibration of sensors

6-1 PAH sensor calibration

A. Click the "Setting" button on the bottom menu bar of the main interface.



B. Click the "CALIBRATE" button the setting interface.



C. Click the " OFF" button



SENSOR CALIBRATION

UTC: 2025-09-12 14:41:52
User: operator11

EGC WATER SIDE SENSOR

PAH SENSOR

PH SENSOR

TURBIDITY SENSOR

ON

Calibration Mode

SEA WATER SIDE SENSOR

PH SENSOR

TURBIDITY SENSOR

OFF

Calibration Mode

Note:
Please prepare some bottles, calibration solutions and dust-free cloths for the following tasks.
Please prepare one bottle for Turbidity calibration.
Please prepare one bottle for PH calibration.
Please prepare one bottle for PAH calibration.

MEAS

SETTING

ALARM

CURVE

HISTORY

ACK

D. Click the " PAH SENSOR" button



SENSOR CALIBRATION

UTC: 2025-09-12 14:42:32
User: operator11

EGC WATER SIDE SENSOR

PAH SENSOR

PH SENSOR

TURBIDITY SENSOR

ON

Calibration Mode

SEA WATER SIDE SENSOR

PH SENSOR

TURBIDITY SENSOR

OFF

Calibration Mode

Note:
Please prepare some bottles, calibration solutions and dust-free cloths for the following tasks.
Please prepare one bottle for Turbidity calibration.
Please prepare one bottle for PH calibration.
Please prepare one bottle for PAH calibration.

MEAS

SETTING

ALARM

CURVE

HISTORY

ACK

E. Remove the turbidity sensor and place it in the standard solution, then let it stand. Click the "START" button.

RKMC **SENSOR CALIBRATION** UTC: 2025-09-12 14:43:05
User: operator11

STEP 1
PAH: 0.0 ppb
1. Immerse the probe into the standard calibration solution.
2. When stable press the button 'START' to begin the calibration process.
START

STEP 2
1. Please rinse the probe with some pure water.
2. Change the standard solution.
CONFIRM

STEP 3
PAH: 0.0 ppb
1. Immerse the probe into the standard calibration solution.
2. When stable press the button 'START' to begin the calibration process.
START

PAH 0.00 TEMP. 0.00 °C Factor(k) -1.#J Offset(b) -1.#J

MEAS SETTING ALARM CURVE HISTORY ACK

F. Please rinse the probe with some pure water. Replace the standard solution. Click the "CONFIRM" button.

RKMC **SENSOR CALIBRATION** UTC: 2025-09-12 14:43:32
User: operator11

STEP 1
PAH: 0.0 ppb
1. Immerse the probe into the standard calibration solution.
2. When stable press the button 'START' to begin the calibration process.
START

STEP 2
1. Please rinse the probe with some pure water.
2. Change the standard solution.
CONFIRM

STEP 3
PAH: 0.0 ppb
1. Immerse the probe into the standard calibration solution.
2. When stable press the button 'START' to begin the calibration process.
START

PAH 0.00 TEMP. 0.00 °C Factor(k) -1.#J Offset(b) -1.#J

MEAS SETTING ALARM CURVE HISTORY ACK

G. Immerse the probe into the standard calibration solution. After stabilizing, press the 'Start' button to start the calibration process. Press the START button. Calibration is completed at each step, and the corresponding step color will change.

RKMCC **SENSOR CALIBRATION** UTC: 2025-09-12 14:43:56
User: operator11

STEP 1

PAH: ppb

1. Immerse the probe into the standard calibration solution.

2. When stable press the button 'START' to begin the calibration process.

START

STEP 2

1. Please rinse the probe with some pure water.

2. Change the standard solution.

CONFIRM

STEP 3

PAH: ppb

1. Immerse the probe into the standard calibration solution.

2. When stable press the button 'START' to begin the calibration process.

START

PAH TEMP. °C Factor(k) Offset(b)

MEAS SETTING ALARM CURVE HISTORY ACK

H. Return to the sensor calibration interface and click the "ON" button to complete the calibration.

RKMCC **SENSOR CALIBRATION** UTC: 2025-09-12 14:41:52
User: operator11

EGC WATER SIDE SENSOR

PAH SENSOR PH SENSOR TURBIDITY SENSOR

ON ☐ Calibration Mode

SEA WATER SIDE SENSOR

PH SENSOR TURBIDITY SENSOR

☐ **OFF** Calibration Mode

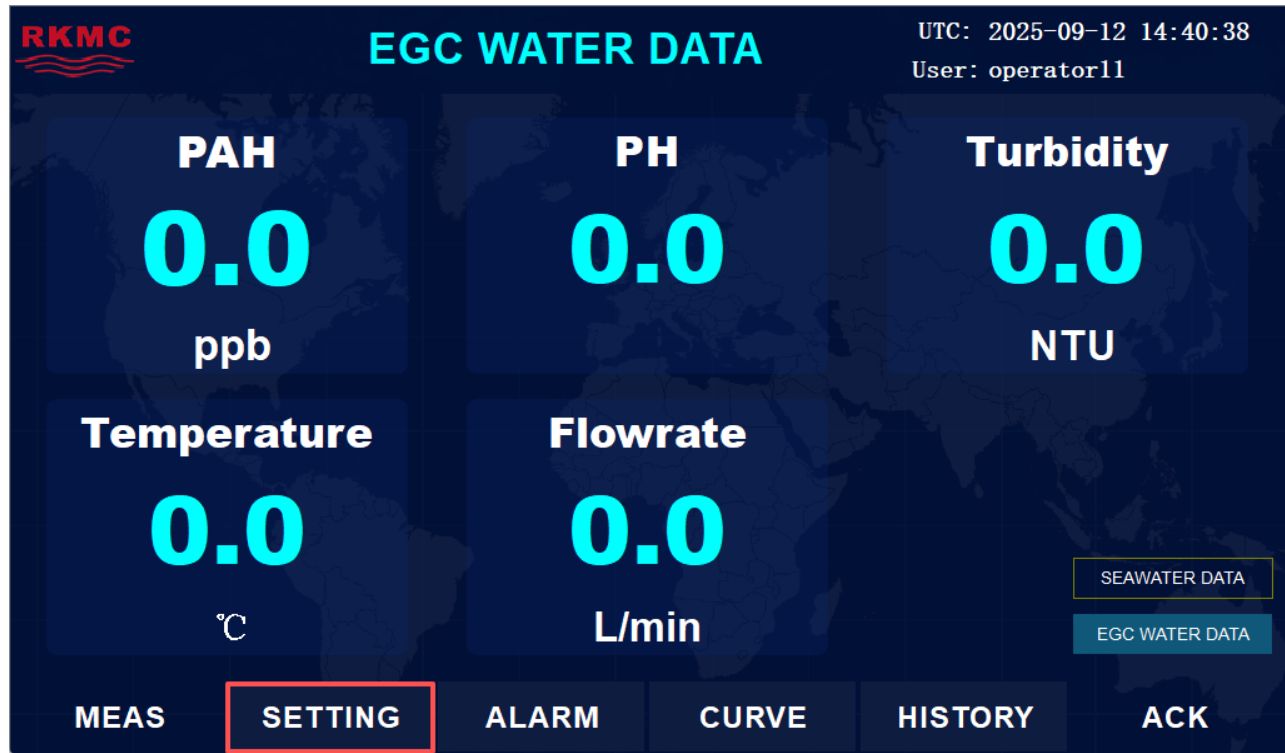
Note:
Please prepare some bottles, calibration solutions and dust-free cloths for the following tasks.
Please prepare one bottle for Turbidity calibration.
Please prepare one bottle for PH calibration.
Please prepare one bottle for PAH calibration.

MEAS SETTING ALARM CURVE HISTORY ACK

I. Restore the sensor installation and open the system's inlet and outlet valves.

6-2 pH sensor calibration

A. Click the "Setting" button on the bottom menu bar of the main interface.



B. Click the "CALIBRATE" button the setting interface.



C. Click the " OFF" button



SENSOR CALIBRATION

UTC: 2025-09-12 14:41:52
User: operator11

EGC WATER SIDE SENSOR

PAH SENSOR

PH SENSOR

TURBIDITY SENSOR

ON

Calibration Mode

SEA WATER SIDE SENSOR

PH SENSOR

TURBIDITY SENSOR

OFF

Calibration Mode

Note:
Please prepare some bottles, calibration solutions and dust-free cloths for the following tasks.
Please prepare one bottle for Turbidity calibration.
Please prepare one bottle for PH calibration.
Please prepare one bottle for PAH calibration.

MEAS

SETTING

ALARM

CURVE

HISTORY

ACK

D. Click the " pH SENSOR" button



SENSOR CALIBRATION

UTC: 2025-09-12 15:42:17
User: operator11

EGC WATER SIDE SENSOR

PAH SENSOR

PH SENSOR

TURBIDITY SENSOR

ON

Calibration Mode

SEA WATER SIDE SENSOR

PH SENSOR

TURBIDITY SENSOR

OFF

Calibration Mode

Note:
Please prepare some bottles, calibration solutions and dust-free cloths for the following tasks.
Please prepare one bottle for Turbidity calibration.
Please prepare one bottle for PH calibration.
Please prepare one bottle for PAH calibration.

MEAS

SETTING

ALARM

CURVE

HISTORY

ACK

E. Remove the pH sensor and place it in the standard solution, then let it stand. Click the "START" button.

The screenshot shows the 'SENSOR CALIBRATION' screen with the RKMCL logo. The top right corner displays 'UTC: 2025-09-12 15:45:27' and 'User: operator11'. The interface is divided into three steps. Step 1 is active, showing a pH value of 0.00 and instructions: '1. Immerse the probe into the standard calibration solution.' and '2. When stable press the button 'START' to begin the calibration process.' The 'START' button is highlighted with a red border. Step 2 shows instructions: '1. Please rinse the probe with some pure water.' and '2. Change the standard solution.' with a 'CONFIRM' button. Step 3 shows instructions: '1. Immerse the probe into the standard calibration solution.' and '2. When stable press the button 'START' to begin the calibration process.' with a 'START' button. At the bottom, there are input fields for PH (0.00), TEMP. (0.00 °C), Factor(k) (0.00), and Offset(b) (0.00). A navigation bar at the very bottom contains buttons for MEAS, SETTING, ALARM, CURVE, HISTORY, and ACK.

RKMCL **SENSOR CALIBRATION** UTC: 2025-09-12 15:45:27
User: operator11

STEP 1
pH: 0.00
1. Immerse the probe into the standard calibration solution.
2. When stable press the button 'START' to begin the calibration process.
START

STEP 2
1. Please rinse the probe with some pure water.
2. Change the standard solution.
CONFIRM

STEP 3
pH: 0.00
1. Immerse the probe into the standard calibration solution.
2. When stable press the button 'START' to begin the calibration process.
START

PH 0.00 TEMP. 0.00 °C Factor(k) 0.00 Offset(b) 0.00

MEAS SETTING ALARM CURVE HISTORY ACK

F. Please rinse the probe with some pure water. Replace the standard solution. Click the "CONFIRM" button.

This screenshot is identical to the previous one, but the 'CONFIRM' button in Step 2 is now highlighted with a red border, indicating it is the next action to be taken. The 'START' button in Step 1 is no longer highlighted.

RKMCL **SENSOR CALIBRATION** UTC: 2025-09-12 15:46:55
User: operator11

STEP 1
pH: 0.00
1. Immerse the probe into the standard calibration solution.
2. When stable press the button 'START' to begin the calibration process.
START

STEP 2
1. Please rinse the probe with some pure water.
2. Change the standard solution.
CONFIRM

STEP 3
pH: 0.00
1. Immerse the probe into the standard calibration solution.
2. When stable press the button 'START' to begin the calibration process.
START

PH 0.00 TEMP. 0.00 °C Factor(k) 0.00 Offset(b) 0.00

MEAS SETTING ALARM CURVE HISTORY ACK

G. Immerse the probe into the standard calibration solution. After stabilizing, press the 'Start' button to start the calibration process. Press the START button. Calibration is completed at each step, and the corresponding step color will change.

RKMCC **SENSOR CALIBRATION** UTC: 2025-09-12 15:48:09
User: operator11

STEP 1

pH: 0.00

1. Immerse the probe into the standard calibration solution.

2. When stable press the button 'START' to begin the calibration process.

START

STEP 2

1. Please rinse the probe with some pure water.

2. Change the standard solution.

CONFIRM

STEP 3

pH: 0.00

1. Immerse the probe into the standard calibration solution.

2. When stable press the button 'START' to begin the calibration process.

START

PH 0.00 TEMP. 0.00 °C Factor(k) -1.#J Offset(b) -1.#J

MEAS SETTING ALARM CURVE HISTORY ACK

H. Return to the sensor calibration interface and click the "ON" button to complete the calibration.

RKMCC **SENSOR CALIBRATION** UTC: 2025-09-12 14:41:52
User: operator11

EGC WATER SIDE SENSOR

PAH SENSOR

PH SENSOR

TURBIDITY SENSOR

ON Calibration Mode

SEA WATER SIDE SENSOR

PH SENSOR

TURBIDITY SENSOR

OFF Calibration Mode

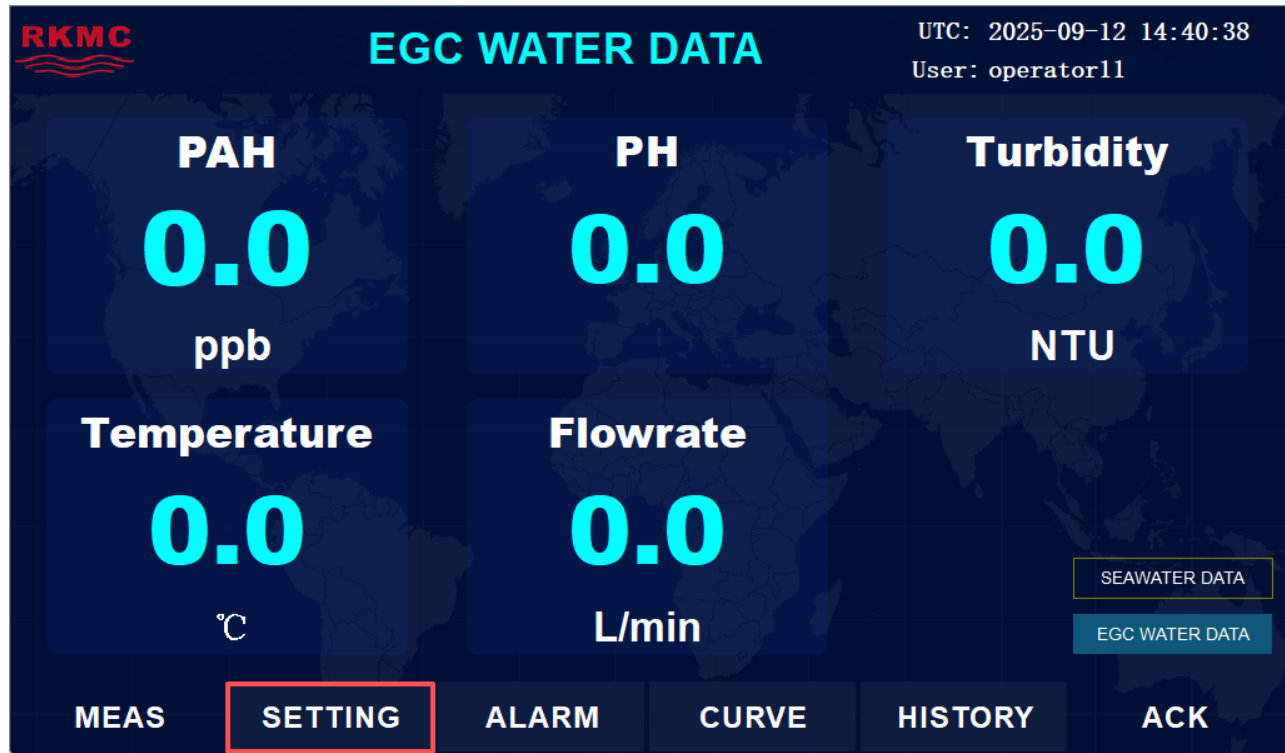
Note:
Please prepare some bottles, calibration solutions and dust-free cloths for the following tasks.
Please prepare one bottle for Turbidity calibration.
Please prepare one bottle for PH calibration.
Please prepare one bottle for PAH calibration.

MEAS SETTING ALARM CURVE HISTORY ACK

I. Restore the sensor installation and open the system's inlet and outlet valves.

6-3 Turbidity sensor calibration

A. Click the "Setting" button on the bottom menu bar of the main interface.



B. Click the "CALIBRATE" button the setting interface.



C. Click the " OFF" button



SENSOR CALIBRATION

UTC: 2025-09-12 14:41:52
User: operator11

EGC WATER SIDE SENSOR

PAH SENSOR

PH SENSOR

TURBIDITY SENSOR

ON

Calibration Mode

SEA WATER SIDE SENSOR

PH SENSOR

TURBIDITY SENSOR

OFF

Calibration Mode

Note:
Please prepare some bottles, calibration solutions and dust-free cloths for the following tasks.
Please prepare one bottle for Turbidity calibration.
Please prepare one bottle for PH calibration.
Please prepare one bottle for PAH calibration.

MEAS

SETTING

ALARM

CURVE

HISTORY

ACK

D. Click the " TURBIDITY SENSOR" button



SENSOR CALIBRATION

UTC: 2025-09-12 15:52:43
User: operator11

EGC WATER SIDE SENSOR

PAH SENSOR

PH SENSOR

TURBIDITY SENSOR

ON

Calibration Mode

SEA WATER SIDE SENSOR

PH SENSOR

TURBIDITY SENSOR

OFF

Calibration Mode

Note:
Please prepare some bottles, calibration solutions and dust-free cloths for the following tasks.
Please prepare one bottle for Turbidity calibration.
Please prepare one bottle for PH calibration.
Please prepare one bottle for PAH calibration.

MEAS

SETTING

ALARM

CURVE

HISTORY

ACK

E. Remove the turbidity sensor and place it in the standard solution, then let it stand. Click the "START" button.

The screenshot shows the 'SENSOR CALIBRATION' screen with the RKMCC logo. The top right corner displays 'UTC: 2025-09-12 15:54:03' and 'User: operator11'. The interface is divided into three steps. Step 1 is active, showing 'TURB: 0.00 NTU' and instructions: '1. Immerse the probe into the standard calibration solution.' and '2. When stable press the button 'START' to begin the calibration process.' The 'START' button is highlighted with a red box. Step 2 shows instructions: '1. Please rinse the probe with some pure water.' and '2. Change the standard solution.' with a 'CONFIRM' button. Step 3 shows instructions: '1. Immerse the probe into the standard calibration solution.' and '2. When stable press the button 'START' to begin the calibration process.' with a 'START' button. At the bottom, there are input fields for 'TURB' (0.00), 'TEMP.' (0.00 °C), 'Factor(k)' (0.00), and 'Offset(b)' (0.00). A navigation bar at the very bottom contains buttons for 'MEAS', 'SETTING', 'ALARM', 'CURVE', 'HISTORY', and 'ACK'.

F. Please rinse the probe with some pure water. Replace the standard solution. Click the "CONFIRM" button.

This screenshot is identical to the previous one, but the 'CONFIRM' button in Step 2 is now highlighted with a red box, indicating the next action. The 'START' button in Step 1 is no longer highlighted. All other elements, including the RKMCC logo, UTC time (2025-09-12 15:55:10), user (operator11), instructions, input fields, and navigation bar, remain the same.

G. Immerse the probe into the standard calibration solution. After stabilizing, press the 'Start' button to start the calibration process. Press the START button. Calibration is completed at each step, and the corresponding step color will change.

RKMC **SENSOR CALIBRATION** UTC: 2025-09-12 15:56:44
User: operator11

STEP 1

TURB: NTU

1. Immerse the probe into the standard calibration solution.

2. When stable press the button 'START' to begin the calibration process.

START

STEP 2

1. Please rinse the probe with some pure water.

2. Change the standard solution.

CONFIRM

STEP 3

TURB: NTU

1. Immerse the probe into the standard calibration solution.

2. When stable press the button 'START' to begin the calibration process.

START

TURB TEMP. °C Factor(k) Offset(b)

MEAS SETTING ALARM CURVE HISTORY ACK

H. Return to the sensor calibration interface and click the "ON" button to complete the calibration.

RKMC **SENSOR CALIBRATION** UTC: 2025-09-12 14:41:52
User: operator11

EGC WATER SIDE SENSOR

PAH SENSOR PH SENSOR TURBIDITY SENSOR

ON Calibration Mode

SEA WATER SIDE SENSOR

PH SENSOR TURBIDITY SENSOR

OFF Calibration Mode

Note:
Please prepare some bottles, calibration solutions and dust-free cloths for the following tasks.
Please prepare one bottle for Turbidity calibration.
Please prepare one bottle for PH calibration.
Please prepare one bottle for PAH calibration.

MEAS SETTING ALARM CURVE HISTORY ACK

I. Restore the sensor installation and open the system's inlet and outlet valves.

7 Technical Specification

7-1 RKMC-EGWMS System parameters

Name	Value	Unit
Type	RKMC-EGWMS	
PH Criteria	0-14	
PAH Concentration	0-500	µg/L
Turbidity	1000	NTU
Temperature of Washwater	0~50	°C
Rated Flow	2-5	L/min
Rated Working Pressure	Max 0.3	Mpa
Measuring Components / Method	PAH : Fluorescence, Turbidity : 90° infrared scattering, pH : pH ptential combination electrode with NTC thermistor	
Error of Measuring	PAH: ±5%FS Turbidity: ±2 NTU pH-value: ±0.2 pH	
Software Version	MS1.0	
Power Source	220 VAC (50/60Hz)	
Degree of Protection	IP56	
Output signal	RS485 Modbus RTU or TCP/IP / 4~20mA	

7-2 Sensor parameters

7-2-1 Technical parameters of turbidity probe:

Model: RKMC-TU-1000

Working principle: 90° light scattering method

Working range: 0.1-1000NTU or 0.1-4000NTU

Measurement accuracy: $\pm 5\%$ or 0.3NTU (whichever is greater)

Protection level: IP68

Work pressure: 3 bar

Temperature range: 0-50 °C

Communication interface: RS-485, Modbus RTU

Rated power: 0.6W

Shell material: titanium alloy

➤ Maintenance Cycle

The cleanliness of the measurement window is crucial for maintaining accurate readings. It is recommended to clean the sensor light window before testing.

MAINTENANCE TASKS	SUGGESTED MAINTENANCE FREQUENCY
CLEAN THE SENSOR	Suggestion 4 weeks (water pollution needs to be shortened)
CALIBRATE SENSORS	Suggested 4 weeks
MAINTAIN AND INSPECT	Suggest replacing the brush every three months with a new one(depending on specific operating conditions)

7-2-2 Technical parameters of pH probe

Model: RKMC-PT-02

Measurement principle: glass electrode method

Working range: 0-14 pH

Measurement accuracy: ± 0.02 pH

Resolution: 0.01

Protection level: IP68

Work pressure: 3 bar

Temperature range: 0-50 °C

Communication interface: RS-485, MODBUS RTU

Rated power: 0.3W

Shell material: POM+titanium alloy

➤ Maintenance Cycle

The cleanliness of the measurement window is crucial for maintaining accurate readings. It is recommended to clean the sensor light window before testing.

MAINTENANCE TASKS	SUGGESTED MAINTENANCE FREQUENCY
CLEAN THE SENSOR	Suggestion 4 weeks (water pollution needs to be shortened)
CALIBRATE SENSORS	Suggested 4 weeks

7-2-3 Technical parameters of PAH probe

Model: RKMC-PA-500

Measurement principle: UV fluorescence method

Range: 0-1000ppb (PAH)

Resolution: 0.01ppb

Detection limit: 1 ppb

Linearity: $R^2 > 0.999$ (continuous dilution of standard solution)

Protection level: IP68

Work pressure: 3 bar

Temperature range: 0-50 °C

Communication interface: RS-485, MODBUS RTU

Rated power: 0.8W;

Shell material: titanium alloy

➤ Maintenance Cycle

The cleanliness of the measurement window is crucial for maintaining accurate readings. It is recommended to clean the sensor light window before testing.

MAINTENANCE TASKS	SUGGESTED MAINTENANCE FREQUENCY
CLEAN THE SENSOR	Suggestion 4 weeks (water pollution needs to be shortened)
CALIBRATE SENSORS	Suggested 4 weeks
MAINTAIN AND INSPECT	Suggest replacing the brush every three months with a new one(depending on specific operating conditions)

7-2-4 Technical parameters of flowmeter

Model: RKMC-FM-01

Power supply: 24V DC

Range: 0~30L/min

Accuracy: 2% FS

Output signal: RS485/4~20Ma

➤ Maintenance Cycle

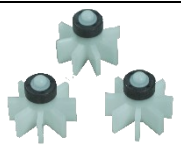
Replace the flowmeter gear every three months, and shorten the maintenance cycle when the water quality is poor.

8 Spare parts

8-1 Spare part list

No.	Part NO.	Specifiction	Image Or Drawing	Maker	Q'TY	Remark
1	RKMC-M01	Turbidity sensor O-ring		RKMC	1 set	
2	RKMC-M02	sensor window brushes		RKMC	1 set	
3	RKMC-M03	PAH sensor O-ring		RKMC	1 set	
4	RKMC-M04	pH sensor O-ring		RKMC	1 set	
5	RKMC-M05	spare gears of flowmeters		RKMC	4 set	
6	RKMC-M06	Filter element of Y-type filter		RKMC	2 set	
		DESCRIPTION :		REFERENCE NO.	CHECK	
		- SPARE PART LIST -			DRAWING	
		Project:		REV	PAGE	DATE

8-2 Recommended replacement cycle for consumables

No.	Part No.	Specifiction	Image	Suggested Maintenance Frequency
1	RKMC-M02	sensor window brushes		Suggest replacing the brush every three months with a new one (depending on specific operating conditions)
2	RKMC-M05	spare gears of flowmeters		Replace the flowmeter gear every three months, and shorten the maintenance cycle when the water quality is poor.
3	RKMC-M06	Filter element of Y-type filter		Replace the filter element every three months, and shorten the maintenance cycle when the water quality is poor.

9 RKMC standard warranty



GUARANTEE RKMC STANDARD WARRANTY

RKMC warrants Exhaust Gas Washwater Monitoring System manufactured and sold by us to be free from defects in materials and workmanship for a period of one year from date of delivery of vessel from Shipyard (or another warranty time agreed). after satisfied function by inspection & testing. Any parts found defective within that period will be repaired or replaced, at our option, free of charge, F.O.B factory. This warranty does not apply to those items which by their nature are subject to deterioration or consumption in normal service, and which must be cleaned & repaired or replaced on a routine basis. Such items may include:

- A. All O rings
- B. Gears of flowmeters
- C. Sensor window brushes

Warranty is voided by abuse including rough handling, mechanical damage. Operation alteration, or repair procedures not in accordance with instruction manual. This warranty indicates the full extent of our liability, and we are not responsible for removal or replacement costs, local repair costs. transportation costs, or contingent expenses incurred without our prior approval.

This warranty is expressly in lieu of any and all other warranties and representations, expressed or implied, and all other obligations or liabilities on the part of RKMC co. Ltd. Including but not limited to the warranty of merchant ability or fitness for a particular purpose in no event shall RKMC co., Ltd. Be liable for indirect, incidental or consequential loss of damage of any kind connected with the use of its products or failure of its product to function or operate properly.

This warranty covers instruments and parts sold (to users) only by authorized distributors dealers and representatives as appointed by RKMC CO., LTD. We do not assume the identification for any accident or damage caused by the operation of this Exhaust Gas Washwater Monitoring System and our warranty is limited to the replacement of parts of our complete goods.

10 World service net

RKMC CO., LTD. always try to supply the best product and service to customers with Considering customer's safety should be the first priority.



RKMC Co., Ltd.

Tel: +86 25 8361 2377

Email: info@rkmc-asia.com

RKMC Co.,Ltd is the name changed from Riken Marine China. Co.,Ltd.

This change is only related to the name of the company,

All rights and obligations of the Old Contracts are under taken by RKMC Co.,Ltd.



Trademark registered in
Japan and China