Online Gas Analysis System

User manual

Wuhan Cubic Optoelectronics Co.，ltd

Catalogue

1 System Overview

Analysis system consisted by two units Gasboard - 3100 Series line of infrared gas analyzers, gas pretreatment unit and sampling device .This kind of system used for detecting coal gas components and their online content, installed pre-processing device in order to removing tar, water vapor and dust, the long-term continuous sampling of gas processing and analysis. Adopt manual mode of operation, simple and practical design.

The core technology of Gasboard - 3100 Series line is infrared which is developed by our company and can meet international advanced level of analytical instruments requirement

Analytical instruments with 4-20mA DC output interface, the value of gas concentration can be converted to analog signal and transmitted to the central control unit for the user to achieve centralized control.

2 Configuration

Gas analysis system consists of the following modules and major components

● Analysis cabinet	600 * 600 * 1200mm	1 set
Washing device		1 pc
Gas filter	STNC TF400	2 pcs
A fiber filter		1 pc
Three way valve	Ø6 stainless steel	1 pc
Two way valve	Ø6 stainless steel	3 pcs
Condensator	AC220V 45W	1 pc
Sampling pump	KNF	1 pc
Storage water tank		1 pc
Stainless steel joints		many
Analyzer	Gasboard-3100	2 pcs
Sampling system		1 set

- Documents

System User manual	1
Analyzer user manual	1
Key	2pcs

- Spare parts

Filter element	5pcs/bag
KNF sampling pump	1unit

3 Main Technical Data

Five gases analyzer

Measurement range ：

CO：0-100% CO2：0-50% CH4：0-20% O2：0-25% H2：0-50%

Resolution： 0.01%

Precision： CO/ CO2 / CH4 ：±2%FS（NDIR）

O2：±3%FS（ECD）

H2: ±2%FS（TCD）

Response time ≤15S

Single gas analyzer

Measurement range

CO2：0-100%

Resolution： 0.01%

Precision： ±2%FS（NDIR）

Response time≤15S

4 System Flow

After take sampling probe out from the gas pipe，sampling gas can be leaded to the cabinet by gas analysis pipeline through shut off valve (for system maintenance when the gas cut off). Firstly remove the majority of tar and dust through washing device , then by two degree precision filter, gas condenser to remove the moisture and dust,

as a kind of clean dry air. Finally, the sample gas through the protection filter into the two analytical instruments respectively.

various components in the System flow chart as follows

- Sampling valve V1

  Cut off sampling pipe when you stop using system or maintain system

- Rinser SX

  Removing the tar and other impurities

- 2 Air filter FT1-FT2

  Separate liquid water and further filtering impurities.。

- Sampling pump PUM

  Supply sampling gas power transmission. Voltage: AC220V, the largest flows: 6L/min

- Condenser CG

  Separate gaseous water.

- Water storage tanks CS

  Storage water which discharged from the condenser.

- Protection filter FIT3

  Protect analyzer to ensure sampling air clean.

- Two way valve V4, V5, V6

  Discharge water which separated from the pretreatment system manually. System should be placed in switch off position

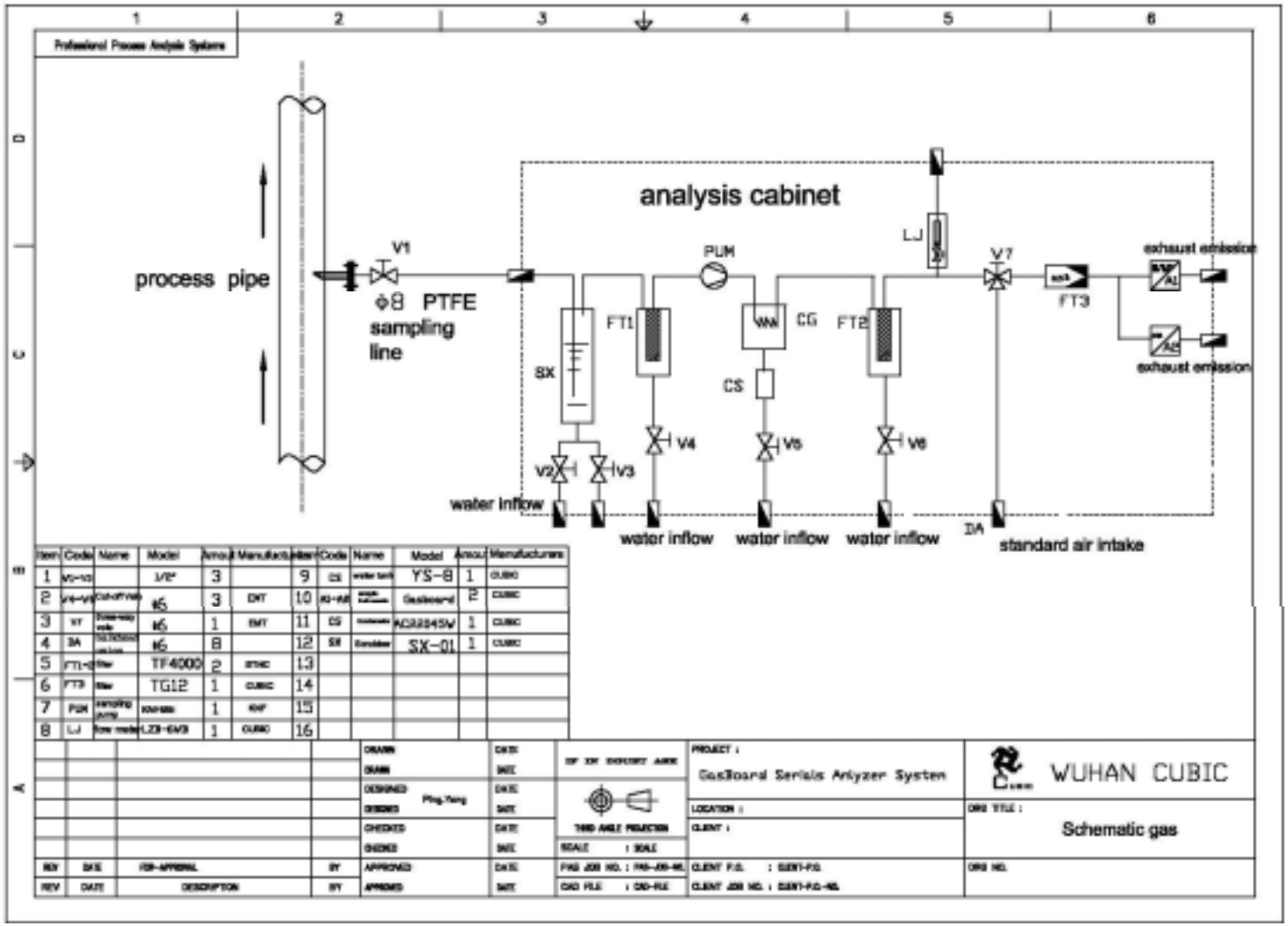
- V7 Three way valve V7

  Switch between sampling and calibration mode.

- Flow meter LJ

  Control the flow of the gas in 1L/min.

System Flow Chart



5 System Installation

- **Gas path installation**

1)When the cabinet of analyzer is transported to the work spot, you should firstly fixup it at the horizontal base by using the mounting holes of the bottom rack.

2)You should install the sampling valve V1 and use the PTFE tube of Ø8 to connect the gas inlet of the cabinet of analyzer. Make sure that the air tightness of connections is good.

3) Lead 1/2" hose out of the cabinet from the pagoda-like joint at the bottom of water scrubber and link the two 1 /2" ball valve by tee junction refering to the flow chart, One path is used as water-inlet pipe of the water scrubber , the other path is used as drainpipe of the water scrubber.

4) Use PU tube of Ø6 to link the outlet of emission of the cabinet and other releasing path and lead the emission to a safe zone.

5) Use PU tube of Ø6 to link the water-outlet so as to lead the disposed Water to a proper place to let. The drainage lines and drainage outlet should below the drainage connection of the cabinet.

- **Electrical Installation**

1) Lead the power of AC220V,50HZ by the cable of 3*1.5mm2 to the top air switch of the cabinet, make the ground wire connected with the part of cabinet which is reaching to earth. Please insert the plugs of the two analyzers separately to plug socket before starting the system.

2) Lead 4~20mA signal of the analyzer by the communication cables to the control room. Two analyzers can share with one communication cable, the communication cable adopts shielded cable of 14*0.5 mm2, and 2 cores of

the cable is for spare. Regarding the mA output signal port instruments, please refer to manual of analyzer.

6 System Operation

- **Electricity inspection**

Close the air switch, switch on the power socket to connect the two analyzers ,then all the analyzers connect electricity. Switch on the left switch of the panel of Gas analyzer, with more than 10 minutes' warming-up, the analyzer goes in stable working condition.

Attention

After each shuting down, please switch on the power once again, you must ensure that the analyzer is warming-up for more than 10 minutes in order to achieve constant temperature in the analyzer,or it will affect the measurement accuracy as a result of temperature change.

- **Calibration of analysis system**

When the triple valve V7 installed at the panel of Cabinets used for sampling/calibration is shifted to the place for calibration, you can get to the step to calibrate the analyzer.

1)Set the display of analyzer at the interface of zero calibration according to the statement of calibration in the manual. Connect the Zero gas with the interface of calibration of the cabinet, adjust the pressure relief valve of standard gas cylinder, observe the gas flow from the flow meter and maintain the gas flow at the rate of 1L/min to slowly flow zero gas to the gas analyzer.Adjust the button on the panel of gas analyzer to carry out zero calibration in accordance with the related statement in the manual.

2) When the zero calibration is completed and confirmed, the analyzer will automatically enter into the span calibration interface. Connect the measuring gas

with the interface of span calibration of the cabinet, adjust the pressure relief valve of standard gas cylinder, observe the gas flow from the flow meter and maintain the gas flow at the rate of 1L/min to slowly flow measuring gas to analysis system of the gas analyzer(until it is filled with the measuring gas).Adjust the button on the panel of gas analyzer to carry out the span calibration in accordance with the related statement in the manual.

Note：

- Before the operating the calibration, you should be familiar with the Manual and the flow chart of gas path of the system.
- Before the calibration, you should ensure the analyzer has been warmed-up for more than 10 minutes.
- Before the calibration, the flow meter LJ on the panel of analyzer should relax by left turning to avoid withstanding too much pressure. When you adjust the pressure relief valve of standard gas cylinder, fistly you should ensure the flow is at the rate of 1.5L/min, and then turn right the flow meter LJ to adjust the flow at the rate of 1L/min so as to avoid unstability by the decrease of flow in the course of calibration operation.
- When you are operating the calibration for one analyzer, you can tighten up the flow meter at the right side of another analyzer.

- Operation of the analysis system

  When you shift the triple valve V7 to the location of sampling, open up the sampling valve V1 and switch on the power of analyzer, sampling pump and condenser, you can enter the sampling work.

  Note：

  At the beginning of sampling, you should ensure that the water scrubber has been injected about 2/3 of clean water of its volume. The Drain valve V4,V5,V6 should be placed in closed position when operating sampling.

7 Analyzer Maintenance

- **Analyzer maintenance**

  If the analyzer of system is working for a long time, the signal of sensor will drift, so the analyzer should be calibrated periodically. Generally, the calibration should be done once in every two or three months. And the operation of air zeroing can be done during the period according to the user manual of the analyzer.

- **Pipeline maintenance**

  1）In order to ensure the reliability of the analysis system operation, should be carry out regular checks each line working situation to ensure that the pipeline without leakage, non-blocking, the pressure within the normal range. Fault can be found according to the following manner:

  2) If the flow meter is too low or even no traffic, they must first determine whether the normal pressure process piping, and then determine whether the sampling line blockage. Special attention that if exhaust pipe blocked , the above phenomenon will also appear.

  3) If the instrument measurement result exist big difference from experience value and gas analyzer haven't abnormal aberration when measured by the standard gas ,maybe pipe have a leaking phenomenon.

- **Precision filter maintenance**

  After ceramic filter element continuous work for 3 ~ 4 months, should be cleaned with acetone solution and also can be reused.

- **Filter maintenance**

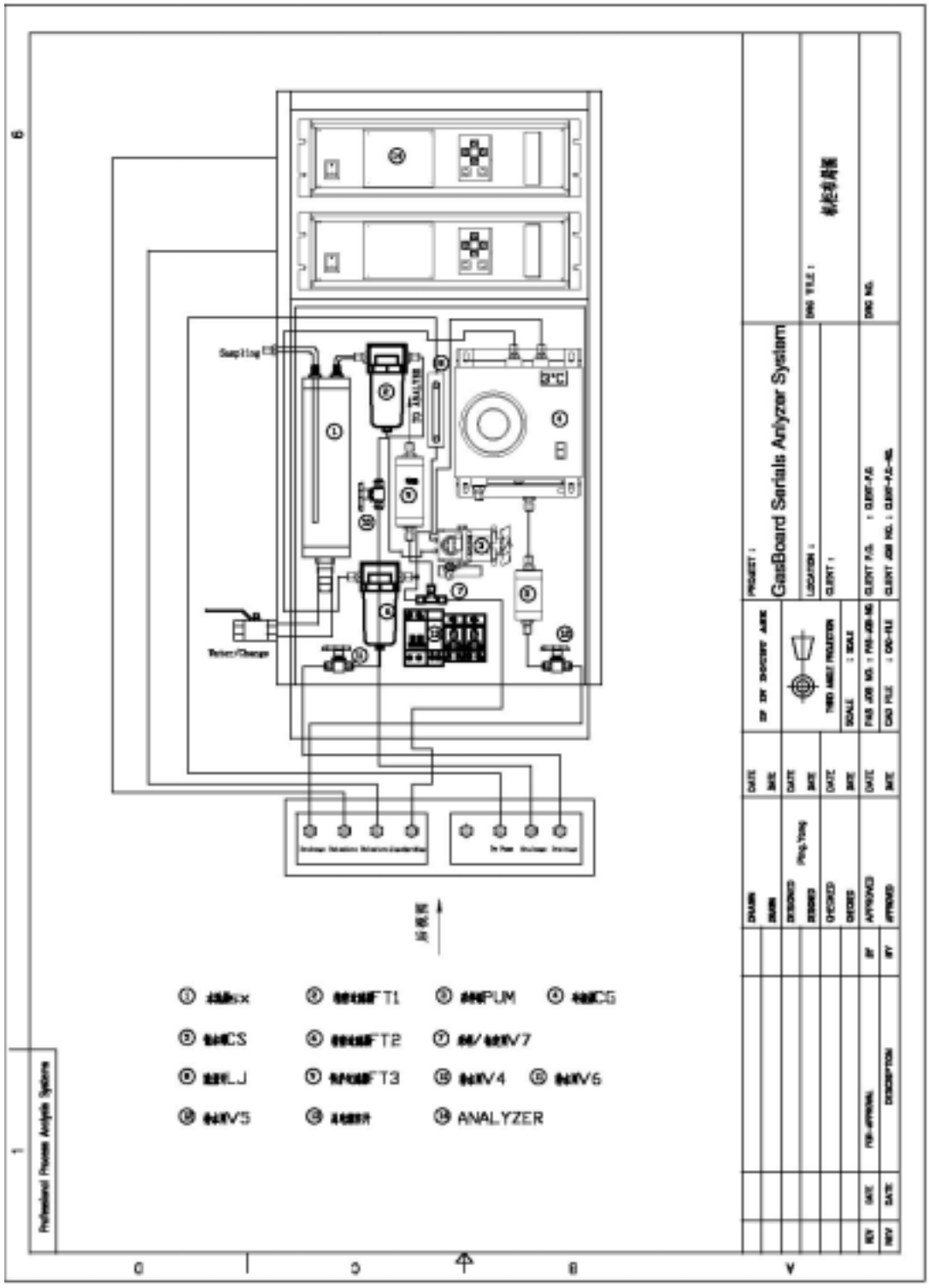
  Protect the fiber filter element, according to the actual pollution, normally replace filter element in every 2 or 3 months . Please ensure good air tightness after replacement.

- **Drainage**

  Should be regular inspect water storage devices, connect V4/V5/V6 valve and drain water in time，in order to prevent water overflow into the posterior

segment and damage analyzer

8 Annex1：Layout



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