

Control No. ZNSXSSE-05

INSTRUCTION MANUAL

**Solid Auto Sampler
MODEL ASC-120S**

MITSUBISHI CHEMICAL ANALYTECH

BUCHANAN, James (1878-1968)

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EC DECLARATION OF CONFORMITY

We hereby declare that the following equipment complies with the essential requirements of:

EC Electromagnetic Compatibility Directive: 89/336/EEC

Electrical Equipment Designed for Use within Certain Voltage Limits : 73/23/EEC

Model Name : Solid Auto Sample Changer Model ASC-120S

Standard to which Conformity is Declared:

EN55011 (1991) Class B

EN50082-1 (1997)

EN61010-1/A2 (1995)

Name of Manufacturer : MITSUBISHI CHEMICAL ANALYTECH CO., LTD

Manufacturer's Address : 370, Enzo Chigasaki, Kanagawa, Japan

EU Office Address : Prinzenallee 13 40549 Duesseldorf Germany

Type of Equipment : Laboratory Equipment

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Name : Toshio Kaneko
: Toshio Kaneko

Position : General Manager

Date : 29 Oct. 2008

DD.MMM.YYYY

THE UNIVERSITY OF CHICAGO

Department of Mathematics, 480 Lincoln Drive, Chicago, IL 60607-7073

Mathematics Preceptor Group, 480 Lincoln Drive, Chicago, IL 60607-7073

Math 551: Real Analysis, Spring 2011

Homework 10: Due Friday, April 22, 2011

1. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function.

(a) Suppose f is continuous.

(b) Suppose f is not continuous.

2. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function. Suppose f is continuous.

(a) Prove that f is continuous.

3. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function. Suppose f is not continuous.

(a) Prove that f is not continuous.

4. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function. Suppose f is not continuous.

(a) Prove that f is not continuous.

5. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function. Suppose f is not continuous.

(a) Prove that f is not continuous.

6. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function. Suppose f is not continuous.

7. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function. Suppose f is not continuous.

(a) Prove that f is not continuous.

8. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function. Suppose f is not continuous.

(a) Prove that f is not continuous.

INTRODUCTION

Thank you for your purchase of our solid auto sample changer Model ASC-120S.

This sample changer is an option for our analyzer. By connecting the unit to our analyzer, 20 samples can be measured automatically at most.

This instruction manual describes each part name, installation, operation, troubleshooting, and specifications.

To use Model ASC-120S efficiently and safely, read this manual and understand functions and operation fully. Read instruction manuals of our analyzers, too.

Appoint the operator at first for the safety use.

Analyzers (AQF-100 is included.)

Analyzers connected to ASC-120S are as follows.

No.	Analyzer name	Model	Indication at system program
1	Total Sulfur/Chlorine Analyzer Total Organic Halogen Analyzer	TOX-100	S-ASC
2	Total Nitrogen Analyzer	TN-110	
3	Trace Sulfur Analyzer	TS-100	ASC-120S
4	Automatic Quick Furnace	AQF-100	

Table 1. Analyzers connected to ASC-120S

NOTICE

- (1) Do not reprint this manual wholly or partially without permission.
- (2) The contents may be changed without notice.
- (3) Though this manual was prepared carefully, contact local distributors when mistakes, omissions, and missing pages are found. But system program screens in this manual may be different partially every version.
- (4) For the influence of used result, we don't take the responsibility regardless of (3).
- (5) Decide operators when using this unit.
- (6) Follow the contents in this manual. When troubles or damages occur by neglecting the contents in this manual, we do not guarantee the unit even within the term.

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Microsoft and Windows are Microsoft's registered trademarks.

Other company and product names are their trademarks and registered trademarks.

IMPORTANT SAFEGUARDS AND PRECAUTIONS

Many thanks for your purchase of our Solid Auto Sample Changer Model ASC-120S.

You should read this instruction manual with care before its use.

Keep the manual at hand when you are operating the analyzer. It should be noted that if you operate the analyzer in the way other than described in the manual, the security can not be assured. If you find questions, errors, and omissions, contact our distributor.

WARNING

“WARNING” SHOWS DANGER OF DEATH AND SERIOUS INJURY CAUSED BY NEGLECTING “WARNING” AND HANDLING THE UNIT MISTAKENLY.

CAUTION

“CAUTION” SHOWS DANGER OF DAMAGES CAUSED BY HANDLING THE UNIT MISTAKENLY.

POINT

INFORMATION IMPORTANT FOR THE ACCURATE USE OF THE UNIT

IMPORTANT SAFEGUARDS AND PRECAUTIONS

At installation

CAUTION

Install the unit at the place where the temperature is 15°C~35°C.
By installing it at immoderate temperature, a fire is caused and operation is unstable.

CAUTION

Install the unit in the place free from direct sunlight to prevent a fire.

CAUTION

Install the unit in the place free from strong vibration or continuous weak vibration to prevent operation instability.

CAUTION

Install the unit in the place free from strong electromagnetic field to prevent error operation.

CAUTION

Install the unit in the place where humidity is under 80% to prevent a fire and electric shock.

CAUTION

Install the unit in the place free from corrosive gas not to deteriorate the unit.

CAUTION

Install the unit in the place free from much dust to prevent a fire and electric shock.

CAUTION

Install the unit in the place where fire is not used to prevent a fire.

CAUTION

Install the unit horizontally.

At the unit use

WARNING

Check gas leak necessarily before using the unit. When organic matter mixes with oxygen or air at high temperature, explosive combustion can occur and glass part such as a pyrolysis tube and a guide tube is damaged.

To prevent explosive combustion, this unit vaporizes slowly sample in argon gas, mixes it with oxygen or air, and combust it. Before the use, check necessarily gas piping looseness, O-ring deterioration, and gas leak by septum removal.

WARNING

Do not expose directly the unit to combustibles and combustible gas.

A high temperature furnace is used for the unit. Combustible liquid causes a fire and is very dangerous.

CAUTION

Appoint a person responsible for the operation and operators.

CAUTION

Check gas flow and inject sample.

CAUTION

Do not touch high temperature part. The electric furnace is heated up to 800°C~1100°C. Do not open the door and touch it with naked hands.

CAUTION

Do not touch a power plug with wet hands to prevent an electric shock.

CAUTION

Do not remake and break a power cable. Do not load a heavy thing on the cable and heat it.

IMPORTANT SAFEGUARDS AND PRECAUTIONS

CAUTION

Do not remove the unit cover except our servicemen. An electric shock and a fire can be caused.

CAUTION

Check that a ground terminal is connected to prevent an electric shock.

CAUTION

When handling chemicals, put on the safety goggles or glasses to protect ear, skin, and eyes. Do not inhale chemicals vapor.

Maintenance and inspection

CAUTION

Check the unit every day before the use. If you fail to check it, it doesn't perform properly and serious accidents can be caused.

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Section 1: Names and Functions of Model ASC-120S

This section describes the names and functions of a solid auto sampler Model ASC-120S.

1-1. Names and functions of the front panel of Model ASC-120S

Illustration 1-1. shows the front view of Model ASC-120S and Table 1-1. shows the names and functions.

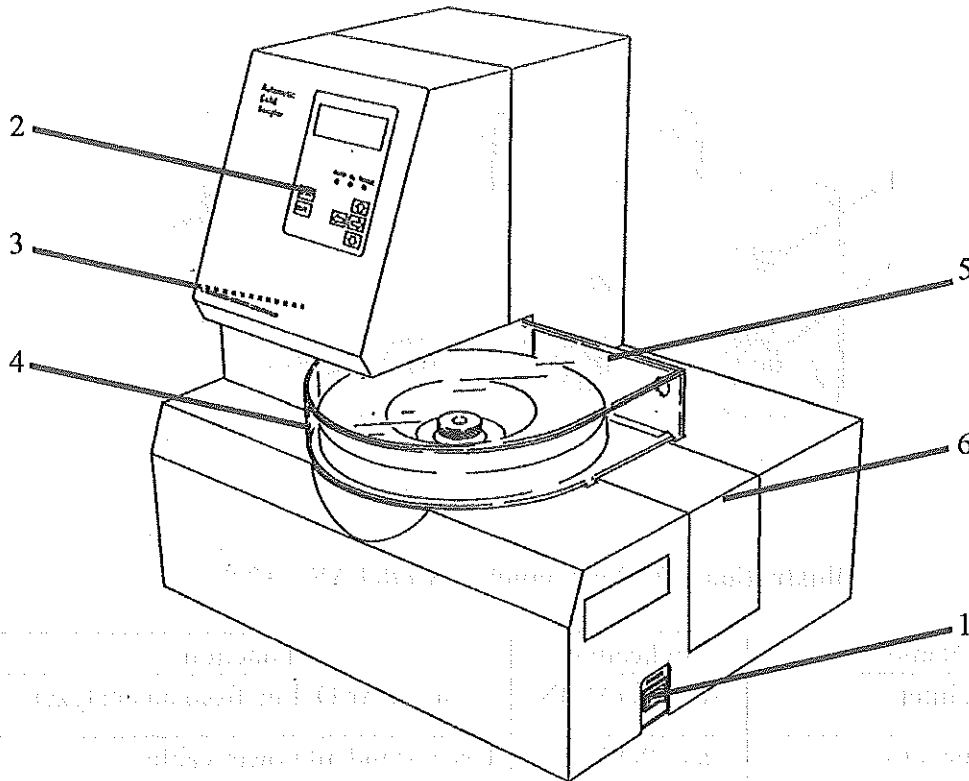


Illustration 1-1. Front panel of Model ASC-120S

No.	Name	Indication	Function
1	Power switch	POWER	ASC-120S power switch
2	Operation panel		Use it to set ASC-120S.
3	Elevator		Arm for moving sample boats
4	Turntable		Table for setting sample boats
5	Turntable cover		Acrylic cover for protecting sample boats
6	Cover for ABC maintenance		When connecting a ladle, a guide tube, an Ar/O ₂ gas line, open this cover.

Table 1-1. Names and functions of Model ASC-120S front panel

1-2. Names and functions of the rear panel of Model ASC-120S

Illustration 1-2. shows the rear view of Model ASC-120S and Table 1-2. shows the names and functions.

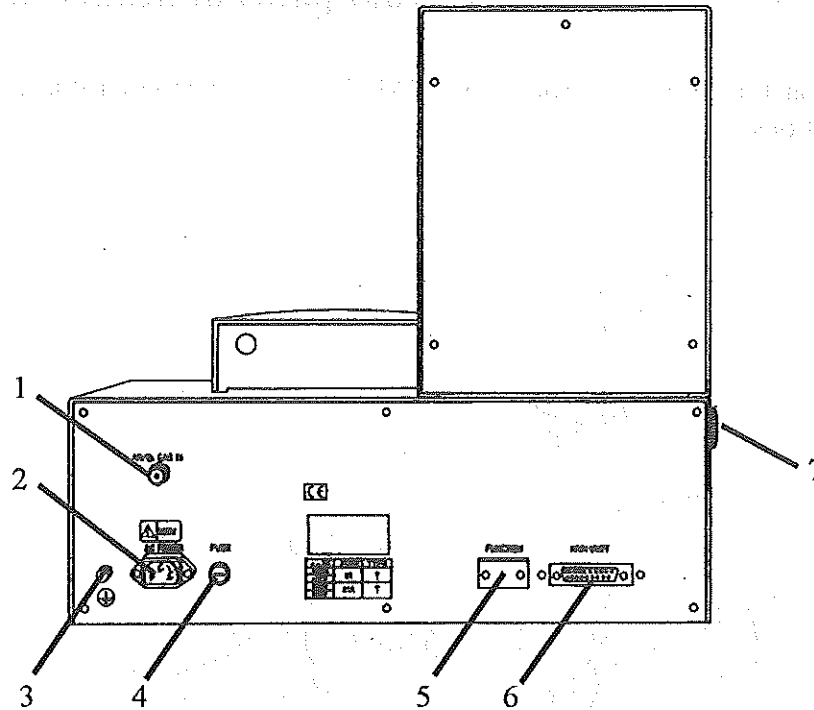


Illustration 1-2. Rear panel of Model ASC-120S

No.	Name	Indication	Function
1	Ar/O ₂ gas inlet	Ar/O ₂ GAS IN	Connect Ar/O ₂ line from an analyzer
2	Power connector	a.c. POWER	Use a standard power cable.
3	Ground terminal	⊕	For connecting an earth cable
4	Fuse holder	FUSE	Use an appropriate fuse. AC 100/115V-5AT AC 230/240V-2.5AT
5	H/W test switch	FUNCTION	For function test (our servicemen)
6	Signal cable connection part	MAIN UNIT	For connecting ASC-120S to an analyzer Connect it by RS-232C (D-SUB 25 Pin/Straight Type)
7	Pyrolysis tube connection part		Connect a pyrolysis tube inserted into an analyzer.

Table 1-2. Names and functions of Model ASC-120S rear panel

1-3. ASC-120S operation panel

Illustration 1-3. shows Model ASC-120S operation panel and Table 1-3. shows the names and functions.

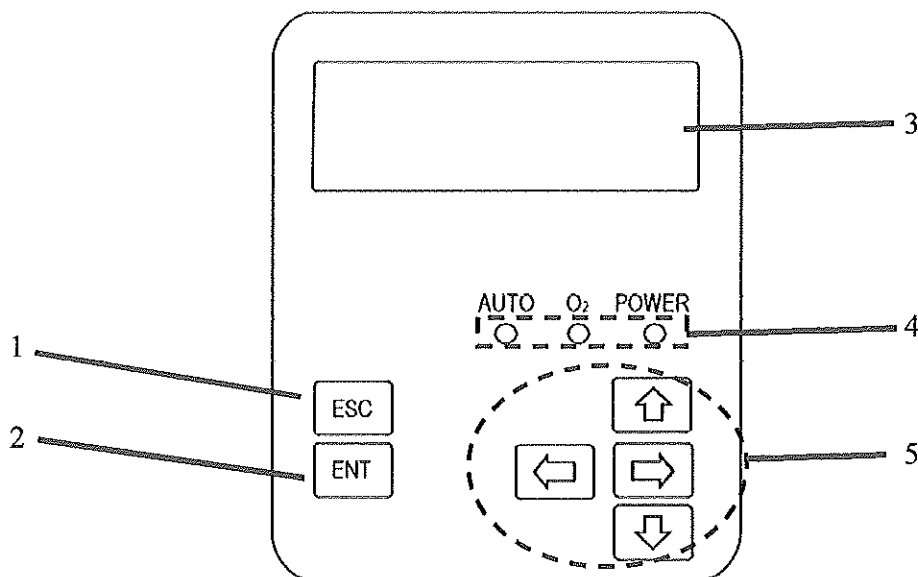


Illustration 1-3. ASC-120S operation panel

No.	Name	Indication	Function
1	Escape key		For ending input conditions or settings
2	Enter key	ENT	For deciding inputted numbers
3	LCD		For displaying ASC-120S conditions and information
4	LED		AUTO: It is on during automatic measurement. O ₂ : It is on when O ₂ flows in a pyrolysis tube. POWER: It is on when power is supplied.
5	Up arrow key		During setting: The cursor moves to the upper item. During manual operation: An arm moves up.
	Down arrow key		During setting: The cursor moves to the lower item. During manual operation: An arm moves down.
	Left arrow key		During setting: The cursor moves to the left item. During manual operation: An arm turns left.
	Right arrow key	→	During setting: The cursor moves to the right item. During manual operation: An arm turns right.

Table 1-3. Names and functions of Model ASC-120S operation panel

Section 1: Names and Functions of Model ASC-120S

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The following diagram shows the components of the Model ASC-120S and their functions.



Diagram illustrating the components and functions of the Model ASC-120S.

Component Name	Function	Model Number	Notes
Power Supply	Provides power to the system.	ASC-120S-PS	
Control Unit	Manages the overall operation of the system.	ASC-120S-CU	
Motor	Drives the mechanical components.	ASC-120S-M	
Sensors	Monitor system status and provide feedback.	ASC-120S-S	
Actuators	Execute control signals to perform actions.	ASC-120S-A	
Communication Module	Enables data exchange with external systems.	ASC-120S-CM	
Power Distribution Unit	Manages power distribution to various components.	ASC-120S-PDU	
Temperature Controller	Regulates the temperature of the system.	ASC-120S-TC	
Pressure Sensor	Monitors system pressure.	ASC-120S-PS	
Flow Meter	Measures the flow rate of the system.	ASC-120S-FM	
Valve Actuator	Controls the opening and closing of valves.	ASC-120S-VA	
Pressure Transducer	Converts pressure into an electrical signal.	ASC-120S-PT	
Flow Transducer	Converts flow rate into an electrical signal.	ASC-120S-FM	
Temperature Transducer	Converts temperature into an electrical signal.	ASC-120S-TM	

Section 2: Packed Parts Check

Carefully unpack and inspect Model ASC-120S. If possible, store the cartons and all packing parts for the future use.

2-1. ASC-120S common parts

No.	Part name	Quantity	Check
1	ASC-120S unit	1 pc	
2	Turntable for ASC-120S	1 pc	
3	Turntable cover for ASC-120S	1 pc	
4	Ladle for ASC-120S	1 pc	
5	Thermal insulator for ASC-120S	1 pc	
6	Fixing board for ASC-120S	1 pc	
7	Sample boat for ASC-120S (5pcs/set) ceramic	4 sets	
8	ϕ 4/2 PTFE tube 0.5m	1 pc	
9	ϕ 4 Nut (with ferrule)	1 set	
10	Glass petri dish	1 set	
11	RS-232C cable 25-pin, straight-type	1 pc	
12	Power cable (AC 100/115V or 230/240V, 2m)	1 pc	
13	2P-3P converting plug (115V only)	1 pc	
14	Fuse, 5A or 2.5A	2 pcs/set	
15	ASC-120S instruction manual	1 pc	

Table 2-1. ASC-120S parts

2-2. Parts by analyzer

Parts by analyzer are as follows. Check the table of your analyzer.

No.	Part name	Quantity	Check
1	Outer pyrolysis tube for TOX-100	1 pc	
2	Inner pyrolysis tube for TOX-100	1 pc	
3	Springs for a pyrolysis tube	1 set	
4	ϕ 4/4 Connector (30-4U-C)*	1 pc	

Table 2-2. Parts for TOX-100

Section 2: Packed Parts Check

No.	Part name	Quantity	Check
1	Outer pyrolysis tube with nails for TN-110 (Catalyst filled)	1 pc	
2	Inner pyrolysis tube for TOX-100	1 pc	
3	Springs for a pyrolysis tube	1 set	
4	ϕ 4/4 Connector (30-4U-C)*	1 pc	

Table 2-3. Parts for TN-110/TOX-100+ND-100

No.	Part name	Quantity	Check
1	Outer pyrolysis tube for TOX-100	1 pc	
2	Inner pyrolysis tube for TS-100	1 pc	
3	Springs for a pyrolysis tube	1 set	
4	ϕ 4/3 Connector (30-4RU3-C)*	1 pc	

Table 2-4. Parts for TS-100

No.	Part name	Quantity	Check
1	Outer pyrolysis tube for TSV	1 pc	
2	Inner pyrolysis tube for AQF-100	1 pc	
3	Springs for a pyrolysis tube	1 set	
4	ϕ 4/4 Connector (30-4U-C)*	1 pc	

Table 2-5. Parts for AQF-100

* When connecting TS-100, change the line at the main unit side from ϕ 3 to ϕ 4 with a ϕ 4/3 connector (30-4RU3-C).

By connecting an attached ϕ 4/4 connector (30-4U-C) to the line from Ar/O₂ gas of the main unit when connecting frequently another option (such as ABC and CRI-100H) to TOX-100 or TN-110 or TOX-100+ND-100 or AQF-100, connection is easier.

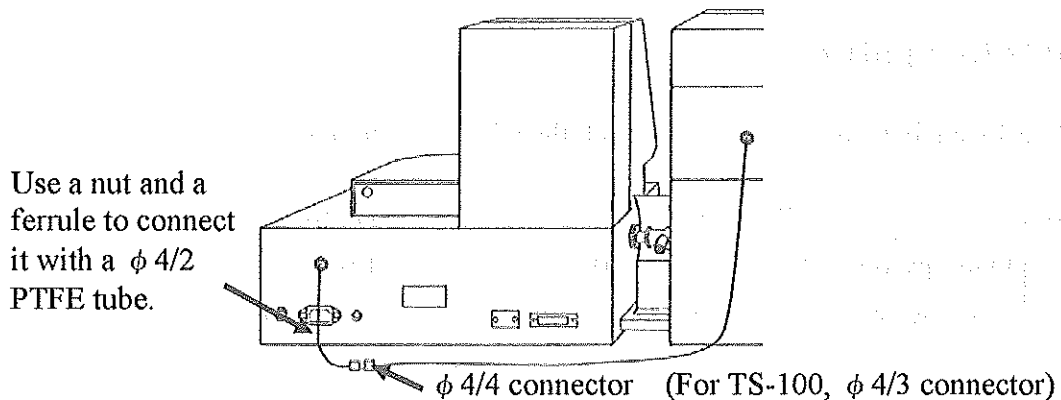


Illustration 2-1. Connection of a connector to Ar/O₂ line

Section 3: Installation

3-1. Installation

Install the unit as the following conditions for the long-term stable use.

Refer to IMPORTANT SAFEGUARDS AND PRECAUTIONS and precautions for the details.

- Room temperature is 15~35°C.
- Free from direct sunlight
- No strong vibration and continuous weak vibration
- No strong electromagnetic field
- The humidity is under 80%.
- No corrosive gas
- Free from much dust
- Fire must not be used.
- No flammable materials
- The horizontal surface for installation.

Even within the guarantee term, we can't compensate the troubles or damages caused by neglecting the above conditions.

3-2. Installation space

ASC-120S system size is as follows. Prepare the space of the following height and width plus the space for the instruction manual for an analyzer.

- ASC-120S size : Width 440mm × Depth 360mm × Height 430mm, weight about 20kg
- Prepare more than 150mm space between the unit and the back wall.

A personal computer and a printer are sometimes different from the following illustration by specifications.

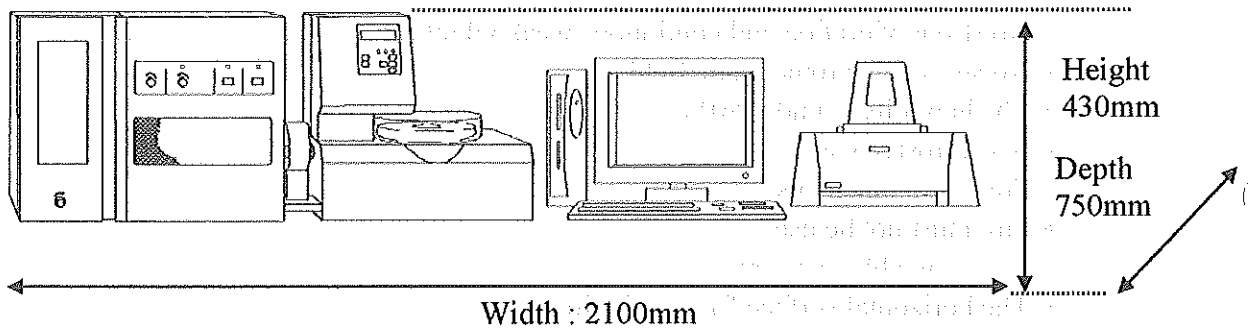


Illustration 3-1. System installation

3-3. Power preparation

3-3-1. Power

ASC-120S power voltage is AC 100V~240V. Consumption power is 150VA.

Prepare 2 lines of power of over 20A in capacity.

The voltage fluctuation range should be within $\pm 10\%$.

When it is over 10%, use a voltage stabilizer.

3-3-2. Grounding

The attached power cable is 3-line type including a grounding line.

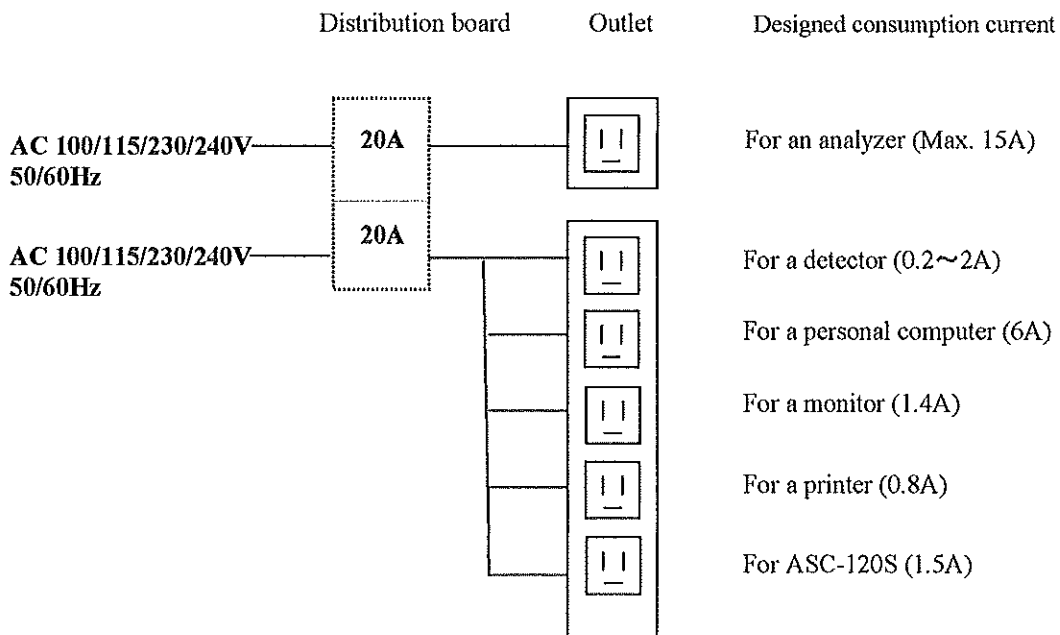
Insert a power cord into a 3-line type power outlet and ground it stably.

If the power outlet is 2-line type, ground it necessarily from the earth terminal of a power cable or the unit left grounding terminal.

Wiring

The following diagram is a wiring example.

Separate the distribution board for an analyzer (including an electric furnace) from the one for others.



By analyzer, attachments such as a detector (including an absorption unit) are different.

The cable length is as follows.

- Power cable for ASC-120S : 2m

3-4. Gas line

Prepare gas lines as follows.

- Prepare an O₂ line and an Ar line on the center of a table.
- Prepare an outer size $\phi 3$ metal line to connect a line to the unit.
- Prepare about 1m space at the end of a line to the unit.

When adjusting gas purity and gas pressure, refer to the instruction manual of the main unit.

3-4-1. Preparation for gas lines

Refer to the instruction manual for an analyzer for the gas line from a metal line on the center of a table to an analyzer. After ASC-120S assembly, connect gas lines.

Refer to 3-5-4. Connection of ASC-120S gas line for details.

3-4-2. Gas evacuation

Sample gas after combustion is discharged from an analyzer (or a detector).

Prepare a ventilating fan or a ventilation line from the gas outlet to the outside.

For the gas outlet position, refer to the instruction manual for an analyzer.

3-5. Preparation for ASC-120S

3-5-1. Setting of ASC-120S

Assemble ASC-120S as follows.

- (1) Remove a turntable cover.
- (2) Remove a turntable.
- (3) Open a maintenance cover for ABC.

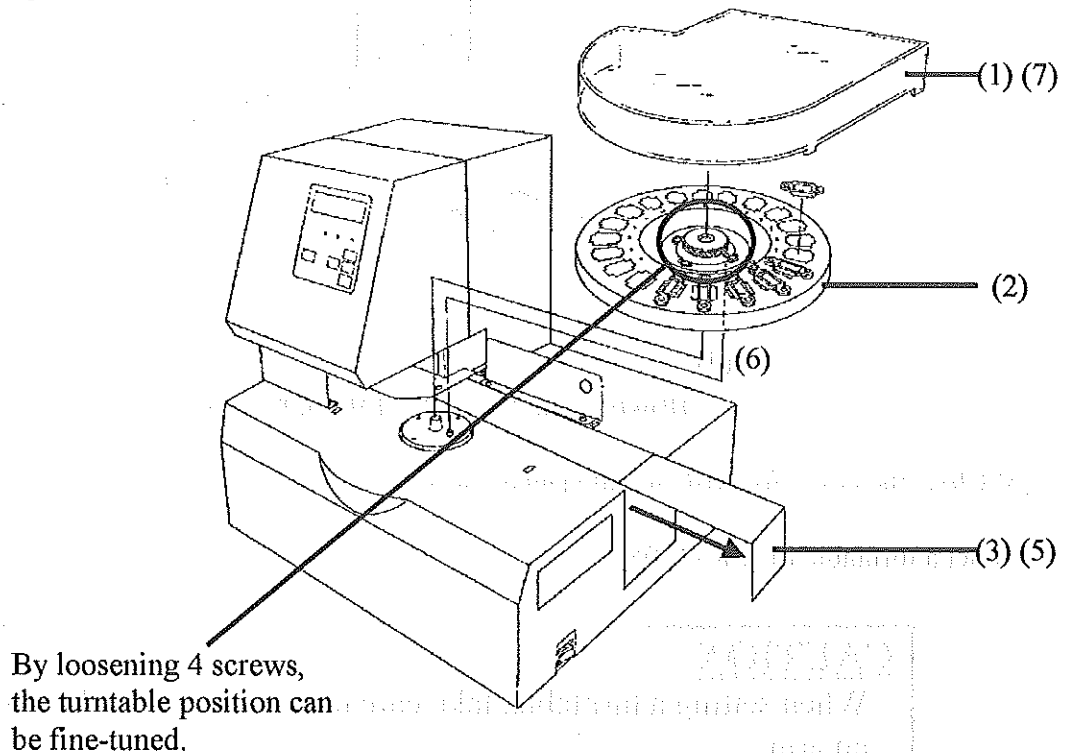


Illustration 3-2. Setting of ASC-120S

Section 3: Installation

- (4) Insert a ladle into the pyrolysis tube setting part from a ladle iron core (part covered with glass).
Set the ladle so that the tip turns up.
At this time, check that the iron core overlaps with the position of the magnet holder at ABC side from ABC maintenance port.

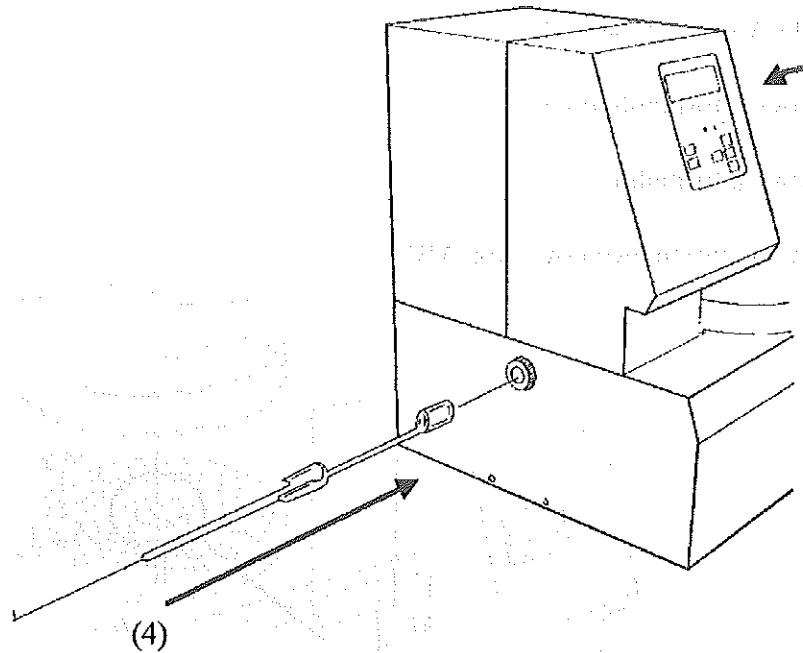


Illustration 3-3. ASC-120S left side

- (5) Close the cover for ABC maintenance cover.
(6) Set a turntable to ASC-120S.

CAUTION

When setting a turntable, take care not to touch the table to an arm.
Check that foreign matter is not adhered to the main unit table and the bottom of a center block.
If foreign matter is adhered, the table is inclined and an arm can't catch a boat correctly.

- (7) Close a turntable cover.

3-5-2. Fixing board setting

Connect a fixing board to ASC-120S as follows. Fix the board by inserting screws into the screw holes of the attached fixing board and the left side of ASC-120S and tightening them.

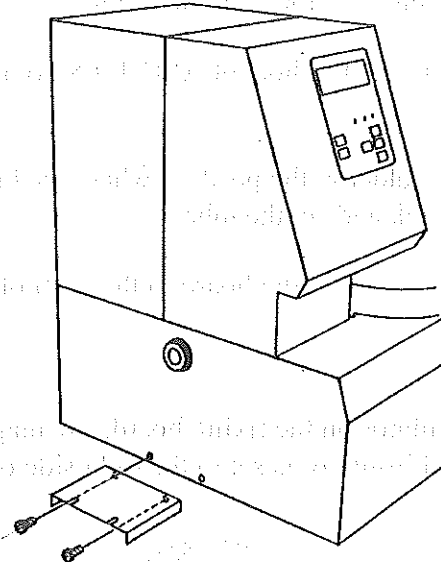


Illustration 3-4. Fixing board setting

3-5-3. Connection of an analyzer and ASC-120S

Connect ASC-120S as follows.

- (1) Pass an O-ring holder through the right of a pyrolysis tube inserted into the analyzer.
- (2) Pass an O-ring by 1cm position from the right.
- (3) Insert the O-ring into the left hole of ASC-120S not to distort it by rotating an inner pyrolysis tube.
- (4) Tighten the O-ring holder at the position where the branch tube of the pyrolysis tube is turned to the unit back and fix the tube.
- (5) Connect ASC-120S to the fixing board in the right of the analyzer and fix it with a knurled screw.
- (6) Put the thermal insulator on the fixing board. (by magnet)
* When the thermal insulator is set to the right side of the analyzer, remove it.

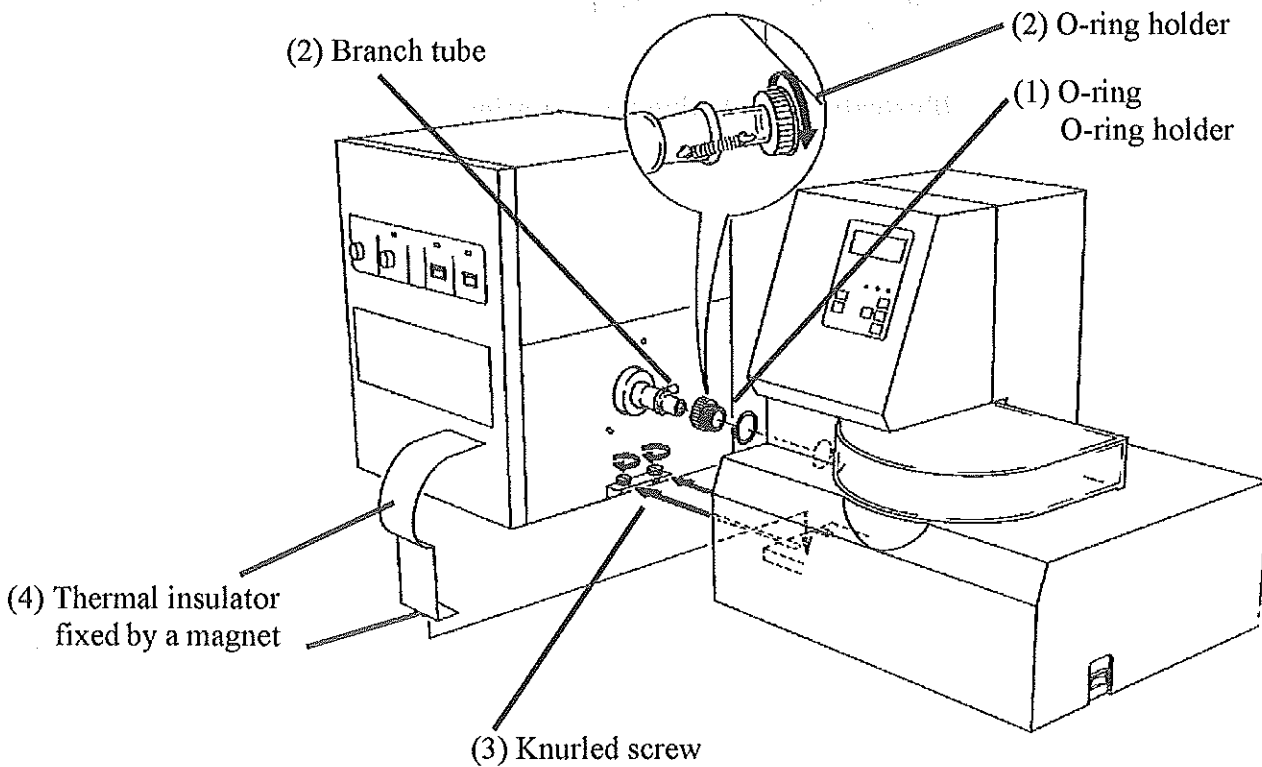


Illustration 3-5. Connection of ASC-120S and an analyzer

CAUTION

After inserting a pyrolysis tube deeply, tighten an O-ring holder. By tightening it too tight, the pyrolysis tube can break.

3-5-4. Connection of ASC-120S gas line

The line connection of an analyzer, a pyrolysis tube, and ASC-120S is as follows.

* Refer to the instruction manual for an analyzer. (Line sizes and connector forms are different by an unit.)

- (1) Set an O₂ gas line from GAS OUT of the analyzer rear panel to the branch tube of the pyrolysis tube with ① connector. (For AQF-100, an elbow-type connector is used.)
- (2) Set Ar/O₂ gas line from GAS OUT of the analyzer rear panel to ② Ar/O₂ GAS IN with attached nuts with ferrules.

* When using TS-100 or replacing ASC-120S with ABC frequently, connect a $\phi 4/4$ connector. Refer to Illustration 2-1. Connection of a connector to Ar/O₂ line for details.

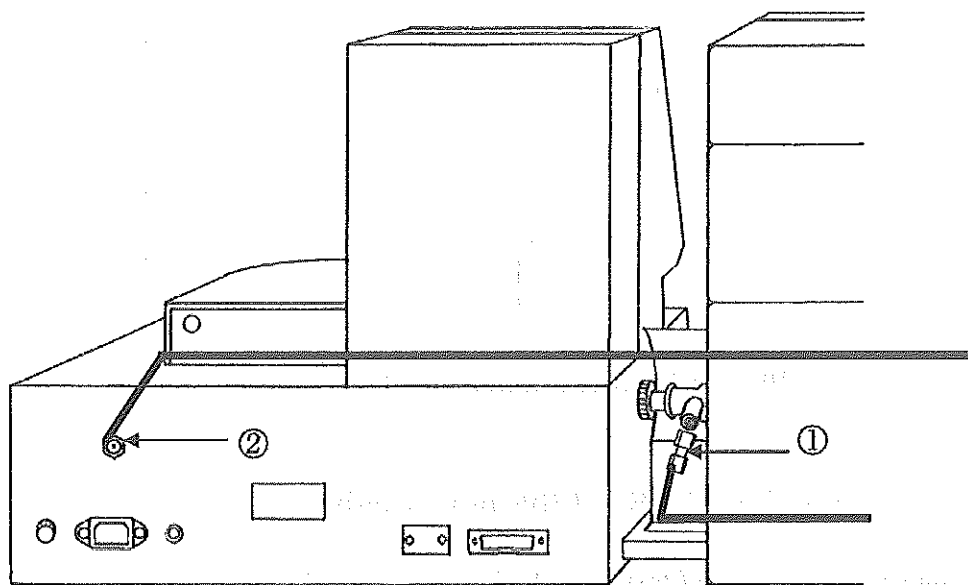


Illustration 3-6. Connection of ASC-120S gas line

3-6. Cable connection

3-6-1. Connection of a communication cable

Connect ASC-120S to the analyzer with a communication cable as follows.

- (1) Connect OPTION 1 connector of the analyzer rear panel to MAIN UNIT connector of ASC-120S rear panel with a RS-232C cable (25-pin straight-type).

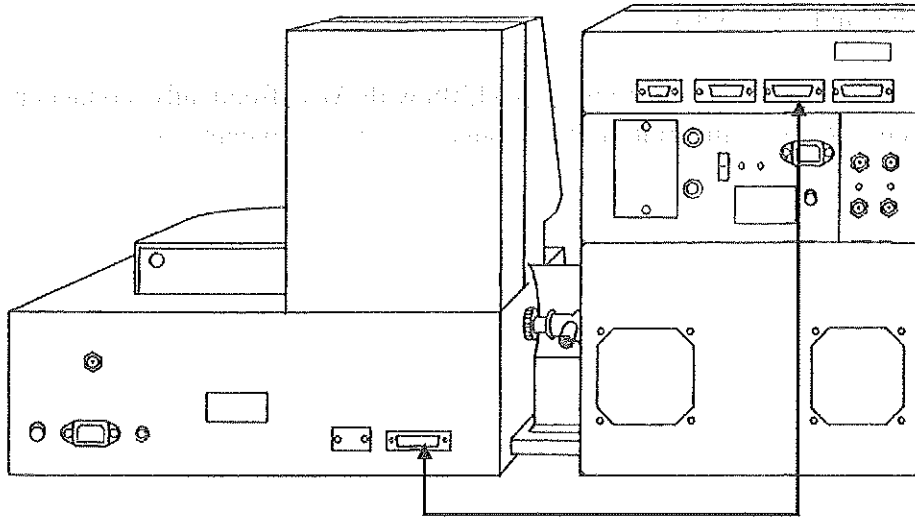


Illustration 3-7. Connection of a communication cable

3-6-2. Connection of ASC-120S power cable

Connect a power cable (2m) to a.c.POWER of ASC-120S rear panel.
For the connection of an analyzer power cable, refer to each instruction manual.

- * For the connection of power cables of a personal computer and a printer, refer to each instruction manual.

Section 4: ASC-120S Function

This section describes Model ASC-120S functions.

4-1. Function type

ASC-120S functions are as follows.

(1) Automatic measurement function (Analysis)

Select it at ASC-120S hardware test.

For the automatic measurement by parameters set by the system program when ASC-120S is connected to the analyzer.

Refer to the function for Section 5: Measurement.

CAUTION

Before automatic measurement, check measurement, combustion, and sample changer conditions. Inadequate conditions cause error operation and explosive combustion.

(2) Manual operation (H/W Test)

Select it at ASC-120S hardware test.

For setting operation program (turntable, ABC, arm, chuck, and sample boat prebaking) exclusively for ASC-120S and checking ASC-120S operation.

CAUTION

Use ASC-120S of conditions set by a serviceman in installation.

LCD indication

The sample boat number is displayed in ASC-120S LCD with #.

Ex. Sample boat No. 20 → Boat#20

Operation panel function

↑ ↓ : For moving a cursor or an arm up and down

← → : For moving a cursor or an arm right and left

[ENT] key : For deciding or moving operation

[ESC] key : For cancellation or suspension, returning to the previous window

4-2. ASC-120S start

Start Model ASC-120S.

- (1) Turn on ASC-120S power switch.
 "Initial Set" screen is displayed.

```

** Initial Set **
...Input [ESC]key=■
    
```

- (2) By pressing [ESC] key, command waiting is canceled and the initial screen is displayed.
 ASC-120S checks the home position.

```

* a waiting minute *
    
```

Initial screen is displayed.
 Proceed to ASC-120S functions.

- (3) To measure automatically, press [ENT] key when "1. Analysis" is selected.
 Command from the system program is waited.

```

** Menu **
■ 1. Analysis
  2. H/W Test
  3. * * *
    
```

- (4) To run H/W test, press key, select "2. H/W test" and press [ENT] key.

```

** Menu **
  1. Analysis
  ■ 2. H/W test
  3. * * *
    
```

- (5) "Test Menu" screen is displayed.
 For each operation, refer to the subsequent explanation.

```

*** Test Menu ***
■ 1. Table
  2. ABC
  3. Arm
  4. Chuck
  5. Sample Inlet Cov
  6. Sequence Run
  7. Initial Home
  8. Boat Prebake
    
```

No.	Indication	Contents
1	Table	Operation test of the turntable
2	ABC	Operation test of ABC
3	Arm	Operation test of the arm
4	Chuck	Operation test of the chuck
5	Sample Inlet Cov	Operation test of the sample inlet box cover
6	Sequence Run	A series of the operation test
7	Initial Home	Resetting of each mechanical part to the initial position (home position)
8	Boat Prebake	Sample boat prebaking

Table 4-1. Test menu

4-3. H/W test

4-3-1. Table

(1) Display “Test Menu” screen.

```

*** Test Menu ***
■ 1. Table
  2. ABC
  3. Arm
    
```

(2) Press [ENT] key when “1. Table” is selected.

(3) Move a cursor to an item with and keys and press [ENT] key.

```

** Table **   ( )
■ Home Position
  1 Step
  Continuous
    
```

No.	Indication	Contents
1	Home Position	The turntable turns to the home position (No.20).
2	1 Step	By pressing [ENT] key, the table is turned by 1 position.
3	Continuous	Continuous operation is run. Press [ESC] key to suspend operation. By pressing [ESC] key, operation is suspended and the condition display screen is displayed. Refer to “Sensor error is displayed in operation panel” in Section 6 : Troubleshooting for details. Run “Home Position” or “1. Step” to return the turntable to the home position.

Table 4-2. Turntable operation test

(4) When the test is completed, press [ESC] key to return to “***Test Menu***” screen.

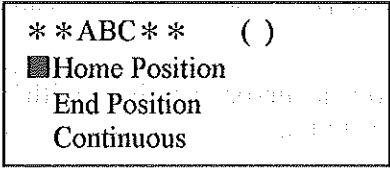
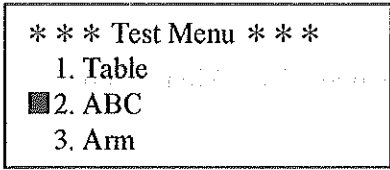
4-3-2. ABC

Run ABC operation test.

(1) Select “ABC” with key and press [ENT] key.

“**ABC**” screen is displayed.

(2) Move a cursor to an item with and keys and press [ENT] key.



No.	Indication	Contents
1	Home Position	The ladle moves to the home position.
2	End Position	The ladle moves to the end position.
3	Continuous	For continuous operation Home position → End position → Home position Press [ESC] key to suspend operation. By pressing [ESC] key, operation is suspended and condition display screen is displayed. Refer to “Sensor error is displayed in operation panel” in Section 6 : Troubleshooting for details. By running home positioning, return the ladle to the correct position.

Table 4-3. ABC operation test

(3) When the test is completed, press [ESC] key to return to “***Test Menu***” screen.

4-3-3. Arm

POINT
 When running “continuous” of the arm test, set a sample boat to the turntable. Without the boat, the sensor error occurs and operation is stopped. When the sensor error is displayed, press [ESC] key to return to “**Arm**” screen and run the test again.

(1) Select “3. Arm” with key and press [ENT] key.

“**Arm**” screen is displayed.

```

*** Test Menu ***
  1. Table
  2. ABC
  █ 3. Arm
    
```

(2) Move a cursor to an item with and keys and press [ENT] key.

The specified operation test is run.

For “Up/Down” and “Left/Right”, a cursor is decided and █ changes from flashing to lighting.

█ returns to flashing condition.

```

** Arm **      ( )
  █↑↓ : Up/Down
    ←→ : Left/Right
      : Continuous
    
```

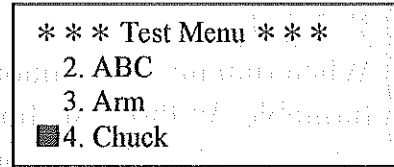
No.	Indication	Contents
1	↑ ↓ : Up/Down	For arm up and down operation, To raise the arm, continue to press [↑] key. To lower the arm, continue to press [↓] key.
2	← → : Left/Right	For arm right and left operation For the left rotation, continue to press [←] key. For the right rotation, continue to press [→] key.
3	Continuous	A sample boat is put to the sample inlet box and returned to the turntable again. A series of operation is run. Details: Arm lowering → Sample boat holding → Arm rise → Arm left rotation → Arm lowering → Cover opening → Sample boat putting → Arm rise → Cover opening and closing → Arm lowering → Sample boat holding → Arm rise → Cover closing → Arm right rotation → Arm lowering → Sample boat putting → Arm rise

Table 4-4. Arm operation test

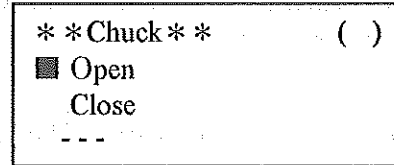
(3) When the test is completed, press [ESC] key to return to “***Test Menu***” screen.

4-3-4. Chuck

(1) Select "4. Chuck" with key and press [ENT] key.
 "*** Chuck**" screen is displayed.



(2) Move a cursor to an item with and keys
 and press [ENT] key



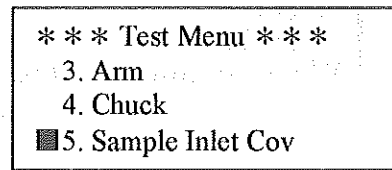
No.	Indication	Contents
1	Open	For opening a chuck
2	Close	For closing a chuck

Table 4-5. Chuck operation test

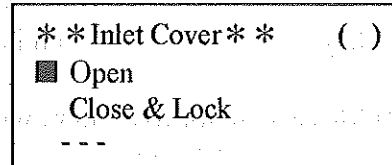
(3) When the test is completed, press [ESC] key to return to "****Test Menu****" screen.

4-3-5. Sample Inlet Cover

- (1) Select "5. Sample Inlet Cov" with key and press [ENT] key.
 "*** Inlet Cover ***" screen is displayed.



- (2) Move a cursor to an item with and keys and press [ENT] key.



No.	Indication	Contents
1	Open	The cover of the sample inlet box is opened. * After Sample Inlet Cov operation test, run Close & Lock to close the cover. (The cover is not closed by "Initial Home" of H/W Test.)
2	Close & Lock	The cover is closed and locked.

Table 4-6. Sample Inlet Cov operation test

- (3) When the test is completed, press [ESC] key to return to "*** Test Menu ***" screen.

4-3-6. Sequence Run

POINT
When running this test, set sample boats to the turntable.

- (1) Select "6. Sequence Run" with key and press [ENT] key. "*** Chuck***" screen is displayed.
- (2) Move a cursor to an item with and keys and press [ENT] key.

*** Test Menu ***
 4. Chuck
 5. Sample Inlet Cov
 6. Sequence Run

Sequence Run ()
 ABC Used
 ABC Not Used

No.	Indication	Contents
1	ABC Used	Sequence Run is run with all mechanical parts including ABC.
2	ABC Not Used	Sequence Run is run with mechanical parts without ABC.

Table 4-7. Sequence Run operation test

- (3) Input times with and keys.

Ex. Boat # 20 002 Time
 1 2

1. The current position (No.) of a sample boat is displayed.

Sequence Run ()
 Number of
 Sequence Run
 Boat # 20 000 Time

2. Specify the number from the next boat.

Use #1 and #2 sample boats.

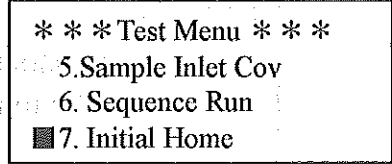
- (4) Press [ENT] key.
Specified times of "Sequence Run" test is run.

- (5) After the test, press [ESC] key to return to "*** Test Menu ***" screen.

4-3-7. Initial Home

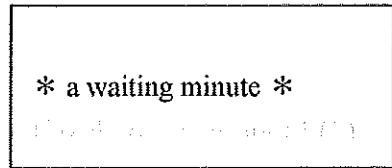
Use this function to return a driving part to the home position after hardware test.

- (1) Select "7. Initial Home" with key and press [ENT] key. Home positioning starts immediately and a turntable, ABC, an arm, and a chuck return to home positions.



* When the cover of the sample inlet box is open, the error is displayed. Press [ESC] key, run Close & Lock of 4-3-5. Sample Inlet Cov, and run home positioning.

- (2) The right screen is displayed during operation. When home positioning ends, the screen returns to "**** Test Menu ****".



4-3-8. Boat Prebake

Sample boats can be prebaked by ASC-120S manual operation. Usually, boat prebaking is run from a personal computer with the system program.

POINT
 Set sample boats to the turntable.
 Check that the temperature of an electric furnace in an analyzer is high.

(1) Select "8. Boat Prebake" with key and press [ENT] key. "*** Boat Prebake ***" screen is displayed.

```

***Test Menu***
6. Sequence Run
7. Initial Home
8. Boat Prebake
    
```

(2) Input the seconds of the stop at end position with and keys. 120 seconds is standard.

```

** Boat Prebake** ( )
ABC End.P Time

000 sec
    
```

(3) Press [ENT] key.

```

** Boat Prebake** (B)
Number of Run

Boat# 20 001 Time
    
```

(4) Input the number of the boats with and keys.

Ex. Boat # 20 002 Time
 1 2

1. The current position (No.) of a sample boat is displayed.
2. At this setting, #1 and #2 sample boats are prebaked.

(5) Press [ENT] key.
 Boat prebaking is run.

(6) After boat prebaking, the screen returns to
 "**Menu**".

```

** Menu      **
1. Analysis
2. H/W TEST
3. ***
    
```

Section 5: Measurement

5-1. Measurement principle

Sample boats with samples are set to the turntable of ASC-120S.

After an arm sets the boat to the sample inlet box, ABC moves the boat to a pyrolysis tube. Sample is heated and vaporized slowly in argon flow and it is combusted completely in oxygen flow.

Samples are different by analyzer. Refer to each instruction manual for details.

The example of gas flow when ASC-120S is connected to an analyzer is as follows.

* When TS-100 is used, Ar/O₂ is Ar line, O₂ is O₂ Main line, and another line is O₂ Sub line.

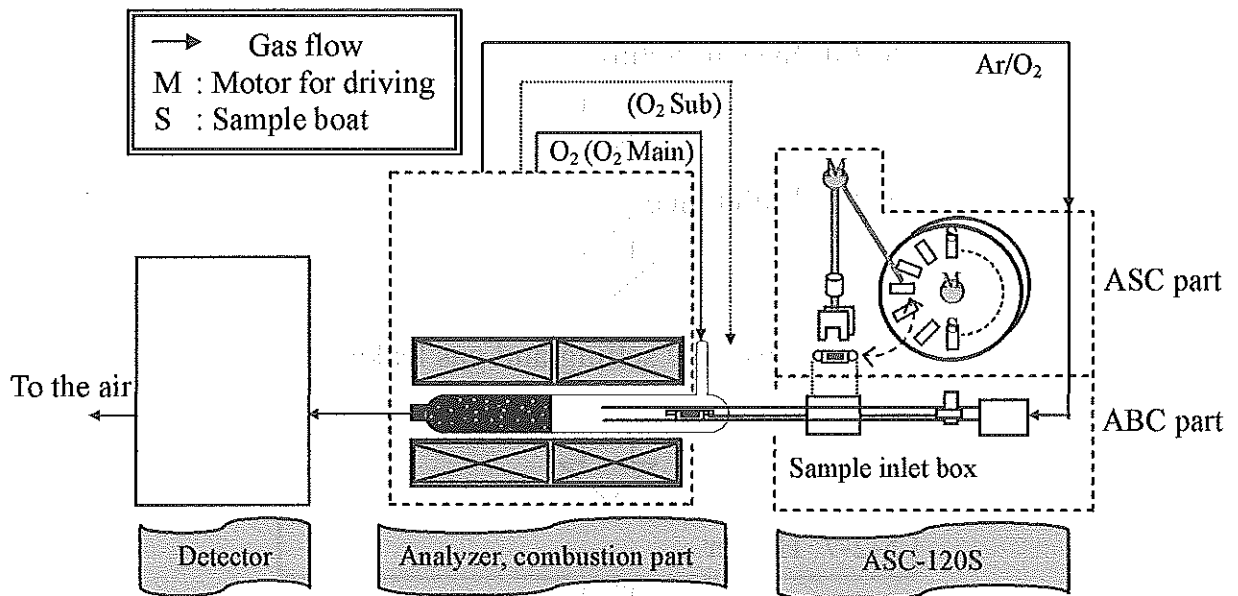
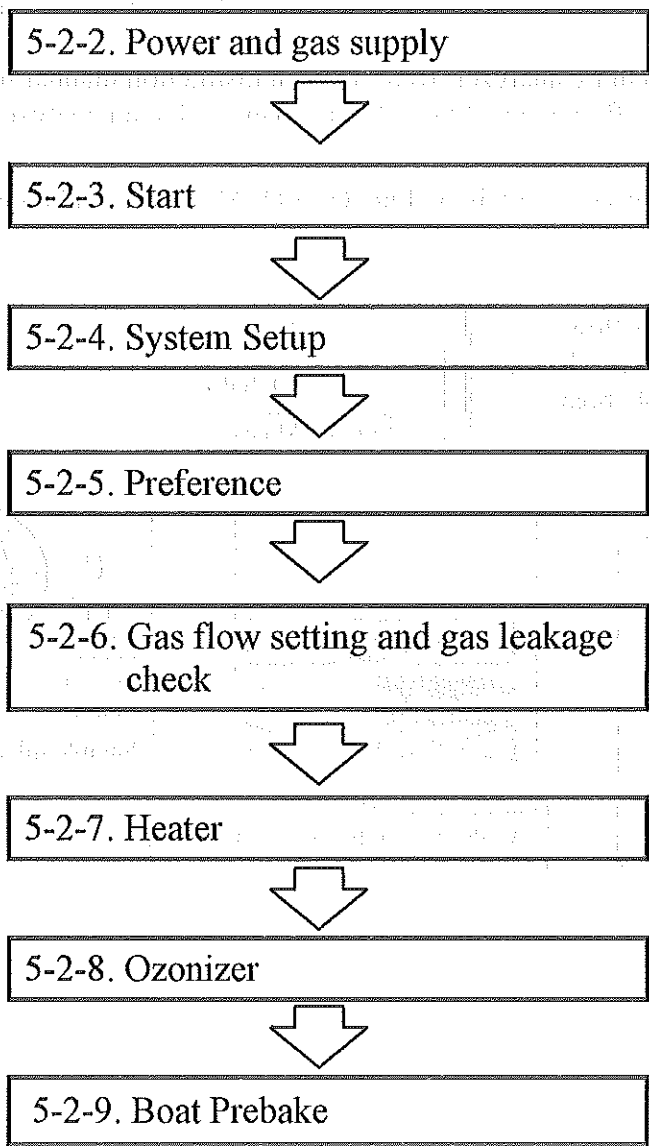


Illustration 5-1. Measurement principle

5-2. Preparation for measurement

5-2-1. Measurement preparation flow

Basic flow of measurement preparation is as follows.



5-2-2. Power and gas supply

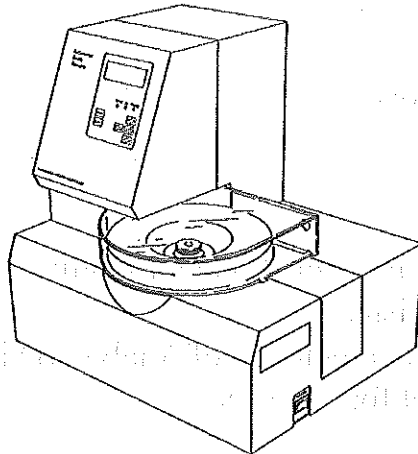
- (1) Open main valves of O₂ gas and Ar gas cylinders.
- (2) Set the second pressures of a cylinder and a STOP valve to 0.3 ± 0.1MPa or 0.4 ± 0.1MPa with a reducing valve. (The setting of the second pressure is different by analyzer.)
- (3) Supply power to the outlet on a table.

5-2-3. Start

- (1) Turn on the following power switches.

A power switch and a heater switch (The analyzer front panel)
Other switches (such as an ozonizer and so on)

- (2) Turn on the power switch of ASC-120S.
"Initial Setting" screen is displayed.



* * Initial Set * *

Input [ESC] key=■

- (3) By pressing [ESC] key, command waiting is canceled and ** Menu** screen is displayed.
ASC-120S checks the home position.

* a waiting minute *

Proceed to ASC-120S functions.

- (4) Check that a cursor is in "1. Analysis" and press [ENT] key.

* * Menu * *

■ 1. Analysis
2. H/W Test
3. * * *

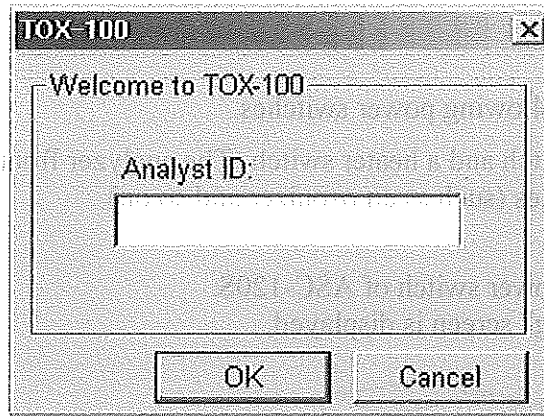
* * * Analysis * * *

Command Waiting...

(esc) key ■

Section 5: Measurement

- (5) Turn on the power switches of a personal computer, a monitor, and a printer.
- (6) Start an analyzer system program.
 1. The operation procedure is described here with "TOX-100".
If you use another analyzer, replace "TOX-100" with your analyzer name.
Click "Programs", "TOX-100 System", and "TOX-100 System".
After "TOX-100 System Program" is displayed, TOX-100 window is displayed.
 2. Input an analyzer model name into "Analyst ID". Click [OK] button.



The system main window is displayed.

POINT

To limit this software user for Product Liability, Analyst ID can be registered. Refer to Registration and deletion of Analyst ID in the instruction manual for analyzers.

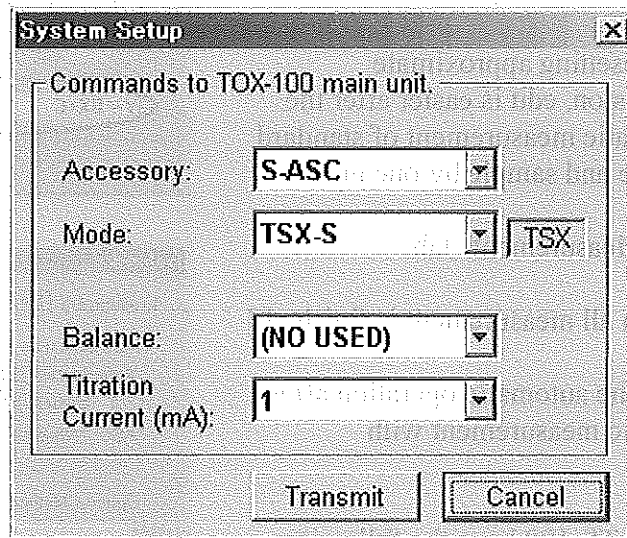
5-2-4. System Setup

Set “Accessory” and “Mode” in “System Setup” and start the communication with the main unit.

POINT

Run necessarily “System Setup” before measurement.
When “System Setup” is completed, TOX-100 unit communication to system program starts.
The icons of “Analysis Parameters”, “Heater”, “Ozonizer”, and “Boat Prebake” are effective and their operation can be run.

- (1) Press <F5> key or click “System” and “System Setup” in the menu of TOX-100 system program. “System Setup” window is displayed.



- (2) Click ▼ of “Accessory” to select “S-ASC” or “ASC-120S”.
- (3) Click ▼ of “Mode” to select it.
- (4) Some analyzers have the following item. Click ▼ to set them.
- Titration Current (mA): Select titration current.
 - Balance: Select a balance marker.
- * By connecting a balance and setting the balance maker when weighing sample with the balance, sampling volume can be transferred to “Sample Size” in the method file.
- * Without a balance, select “NO USED”.
- (5) Click [Transmit] button.
“System Setup” is saved and “System Setup” window is closed.
Analyzer system program starts to communicate with the analyzer.

5-2-5. Preference

Set the environment of analyzer system program and automatic operation.
ASC-120S setting is described here.

POINT

Set "Preference" if necessary.

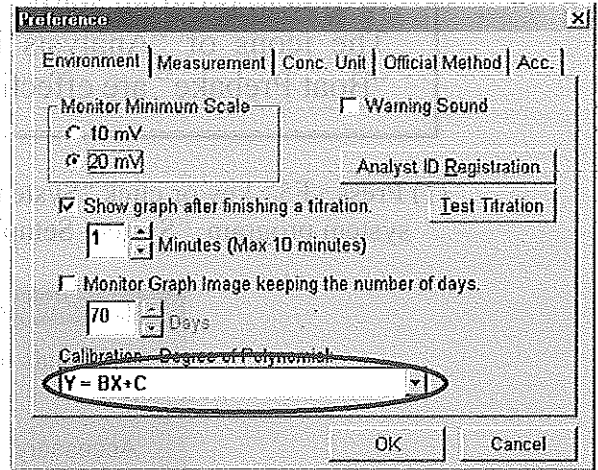
(1) Click "System" and "Preference".
"Preference" window is displayed.

(2) Click [Environment].

Click ▼ of

"Calibration-Degree of Polynominal" to select an approximate expression.

* By presetting approximate expression, edit is easier after the automatic measurement of standard sample and sample by one method.



(3) Click "Measurement" tab.

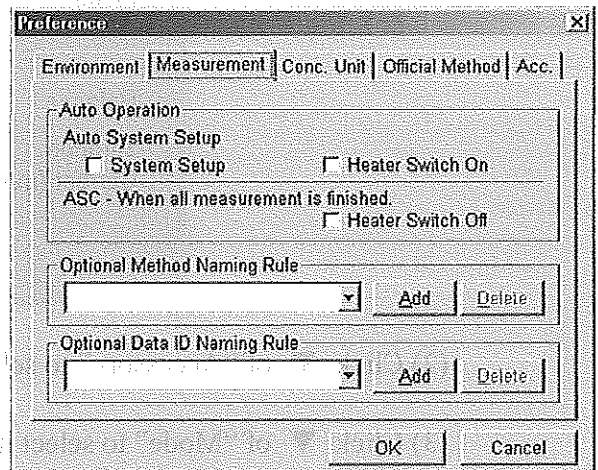
[ASC-When all measurement is finished.]

For setting the automatic operation after the automatic measurement with ASC-120S

TN-110 and TS-100 have the following item.

[Change Sens. in Method.]

For using plural Sens. in one method, "Change Sens." is added to "Target" of a method window.

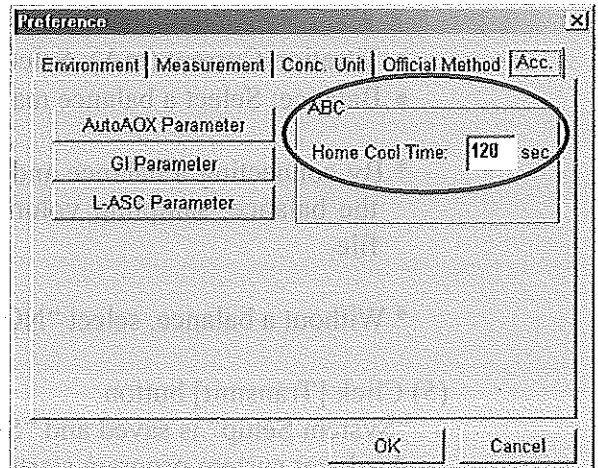


(4) Click "Acc." or "Accessory" and set "Home Cool Time" to 0.

"Home Cool Time" is for cooling a sample boat at home position (in a sample inlet box).

For ASC-120S, sample boats at the turntable are used in order.

By setting it to 0, one measurement time can be shortened.



(5) Click [OK] button.

"Preference" contents are saved and "Preference" is closed.

5-2-6. Gas flow setting and gas leakage check

Change gas at the personal computer side, adjust gas flow of an analyzer, and check gas leakage.

For gas flow and gas leakage check points in the analyzer side, refer to the instruction manual for an analyzer.

CAUTION

After turning on the power switch, more than 30 minutes is required to stabilize an analyzer flow sensor.

The flow can be checked in the "Status" of the main window.

After full time, check gas leakage.

CAUTION

Check gas leakage when the heater switch is off. By checking gas leakage when the switch is on, you can get burned.

When setting a gas flow meter for gas leakage check, a pyrolysis tube already can be hot. Take care not to get burned.

CAUTION

Do not clog the outlet of a pyrolysis tube. The tube breaks and you can get hurt.

CAUTION

If flow is under the set value, gas can leak. Stop the unit use immediately and check gas leakage.

Section 5: Measurement

- (1) Replace the ball joint of a pyrolysis tube outlet with one of a flow meter (option) for gas leakage check.
- (2) Check the flow meter value is within the specified value set by the instruction manual for an analyzer.
- (3) If the value is under the set flow, refer to Illustration 5-2 and check gas leakage.
- (4) Recover gas leakage points and run (2) again.

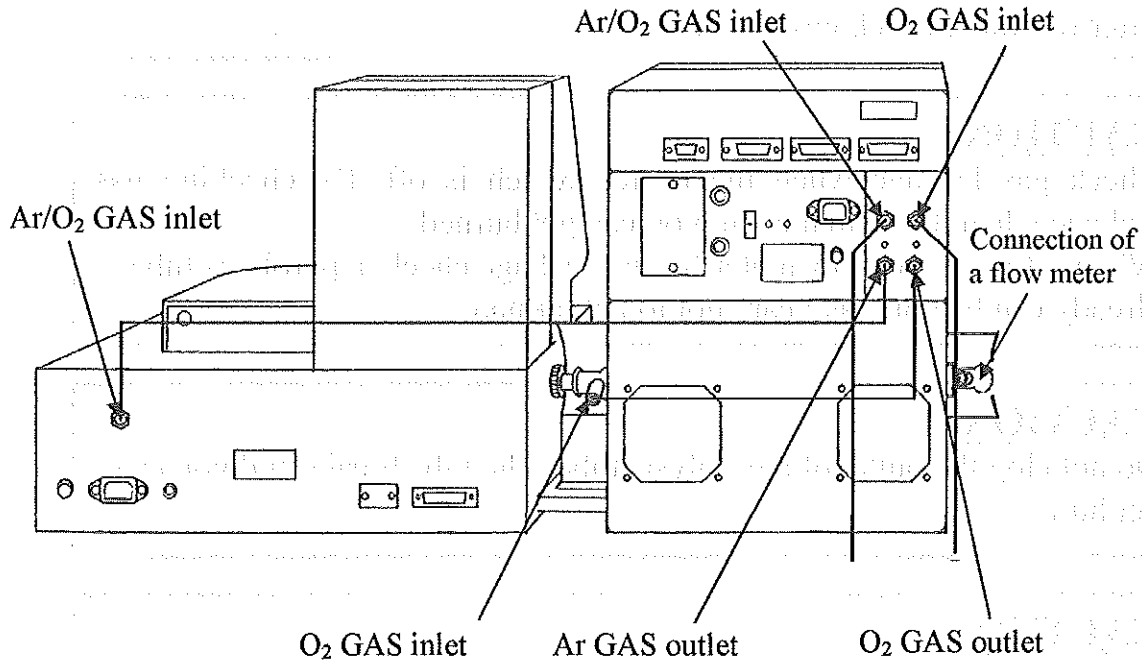





Illustration 5-2. Gas leakage check points

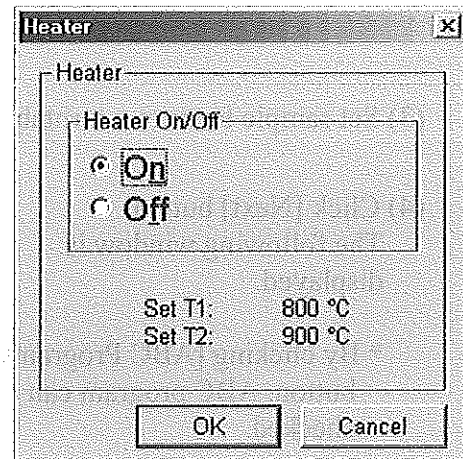
5-2-7. Heater

POINT

Turn on an analyzer heater switch and click “On” and [OK] button in “Heater” window.

Before the temperature reaches the set temperature and the heater is stable, more than 60 minutes is required.

- (1) Click  or click “System” and “Heater”. “Heater” window is displayed.
- (2) Click “On”.
- (3) Click [OK] button.
The temperature starts to rise.
“Heater” window is closed and  (blue) changes to  (red).





5-2-8. Ozonizer

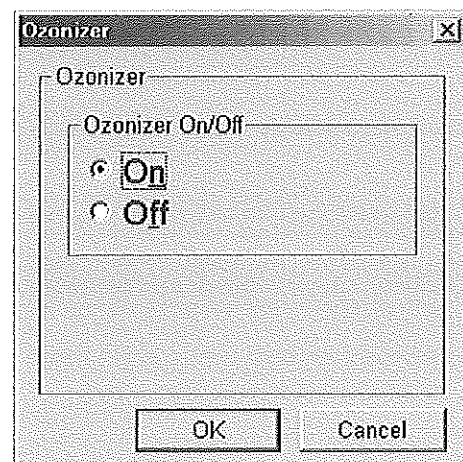
Some analyzers have an ozonizer.

POINT


Start an ozonizer necessarily when oxygen flows.

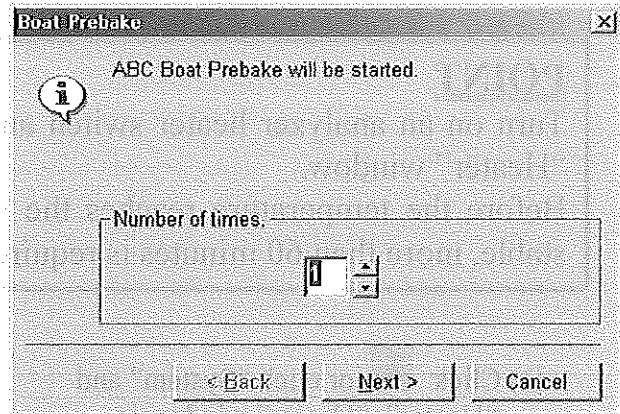
Before the ozonizer is stable, about 30 minutes is required.

- (1) Click  or “System” or “Ozonizer”. “Ozonizer” window is displayed.
- (2) Click “On”.
- (3) Click [OK] button.
Ozone generates.
“Ozonizer” window is closed and the shortcut button changes to  (yellow).



5-2-9. Boat Prebake

(1) Click  or click "Run" and "Boat Prebake".
"Boat Prebake" window is displayed.

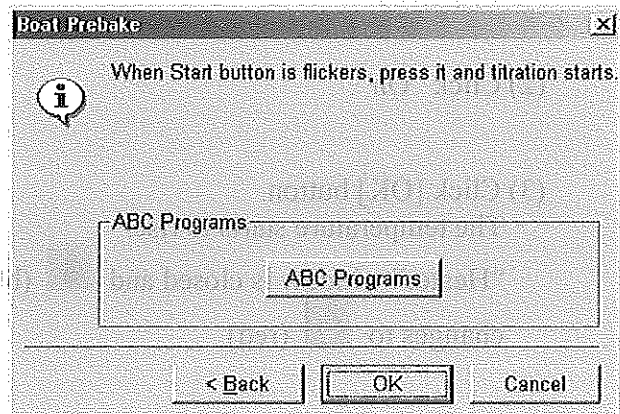


(2) Input "Number of times".

(3) Set sample boats to a turntable.

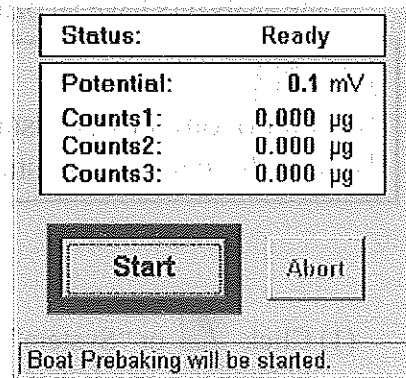
(4) Click [Next] button.
The following window is displayed.

* By clicking [ABC Programs] button, ABC program can be checked.



(5) Click [OK] button. "Boat Prebake" window is closed.

(6) Click [Start] or press <Enter> key.
Boat prebaking starts.



Prebaking of ASC-120S sample boats (Operation panel)

- (7) 1 prebaking requires about 4~5 minutes and set times are repeated automatically. "Boat Prebake" is indicated in "Analysis Status".

"Ready" in [Status] changes to "Busy" and ASC-120S waits for the communication from the system program.

The home position is checked.

It is No. 20 of the turntable.

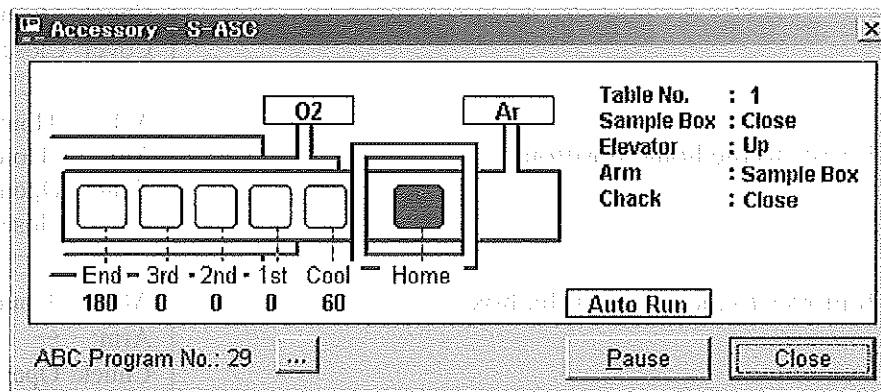


By clicking **Accessory**, current operation is displayed.

```
*** Analysis ***
Command Waiting...

(esc) key=■
```

```
*** Auto ***
Ready...
```



No.	Item	Indication	Contents
1	Table No.	1~20	The number (turntable No.) of a sample boat during measurement is displayed.
2	Sample Box	Close	The opening and closing of the sample inlet box cover is displayed.
		Open	
3	Elevator	Up	The up and down operation and stop position of the chuck is displayed.
		Sample Box	
		Turn Table	
4	Arm	Sample Box	The left and right position of the chuck is displayed.
		Turn Table	
5	Chuck	Close	The opening and closing of the chuck to grip sample boats are displayed.
		Open	

Table 5-1. Operation display of ASC-120S system program

(8) The turntable rotates.

ABC:	Home	Table:	Step
Arm:	Home	(1/20)	
Chuck:	Close		
Cover:	Close		

(9) The chuck opens and the arm lowers.

ABC:	Home	Table:	Step
Arm:	↓	(1/20)	
Chuck:	Open		
Cover:	Close		

(10) The arm lowers to the sample boat position.

ABC:	Home	Table:	Step
Arm:	End	(1/20)	
Chuck:	Close		
Cover:	Close		

(11) The chuck grips a sample boat. The arm rises.

ABC:	Home	Table:	Step
Arm:	↑	(1/20)	
Chuck:	Open		
Cover:	Close		

(12) It rises to the home position.

ABC:	Home	Table:	Step
Arm:	Home	(1/20)	
Chuck:	Open		
Cover:	Close		

(13) It moves to the sample inlet box.

ABC:	Home	Table:	Step
Arm:	←	(1/20)	
Chuck:	Open		
Cover:	Close		

(14) It lowers to the box. The cover opens.

ABC:	Home	Table:	Step
Arm:	Home	(1/20)	
Chuck:	Open		
Cover:	Close		

ABC:	Home	Table:	Step
Arm:	↓	(1/20)	
Chuck:	Open		
Cover:	Open		

(15) It lowers to End in the box and releases the boat.

ABC:	Home	Table:	Step
Arm:	End	(1/20)	
Chuck:	Open		
Cover:	Open		

(16) It rises.

ABC:	Home	Table:	Step
Arm:	↑	(1/20)	
Chuck:	Open		
Cover:	Open		

(17) It rises to the home position.

ABC:	Home	Table:	Step
Arm:	Home	(1/20)	
Chuck:	Open		
Cover:	Open		

(18) The chuck closes. The box cover closes.

ABC:	Home	Table:	Step
Arm:	Home	(1/20)	
Chuck:	Close		
Cover:	Close		

(19) The boat moves to End position.
It stops at the position for 180 seconds.
180 seconds is the initial value.

ABC:	End	Table:	Step
Arm:	Home	(1/20)	
Chuck:	Close		
Cover:	Close		

(20) It moves to Cooling position.
It stops at the position for 120 seconds.
(By setting the value to 0, prebaking time can be shortened. Refer to 5-2-5. Preference for details.)

ABC:	CP	Table:	Step
Arm:	Home	(1/20)	
Chuck:	Close		
Cover:	Close		

(21) It moves to the home position.

ABC:	Home	Table:	Step
Arm:	Home	(1/20)	
Chuck:	Close		
Cover:	Close		

(22) The arm opens and lowers.
The box cover opens.

ABC:	Home	Table:	Step
Arm:	↓	(1/20)	
Chuck:	Open		
Cover:	Open		

(23) The chuck grips the boat.

ABC:	Home	Table:	Step
Arm:	End	(1/20)	
Chuck:	Open		
Cover:	Open		

(24) The arm rises.

ABC:	Home	Table:	Step
Arm:	↑	(1/20)	
Chuck:	Open		
Cover:	Open		

(25) It rises to the home position.

ABC:	Home	Table:	Step
Arm:	Home	(1/20)	
Chuck:	Open		
Cover:	Open		

(26) It moves to the turntable.
The box cover closes.

ABC:	Home	Table:	Step
Arm:	→	(1/20)	
Chuck:	Open		
Cover:	Close		

(27) It lowers to the boat position.
The chuck opens and the boat is returned to No.1 of the table.

ABC:	Home	Table: Step
Arm:	↓	(1/20)
Chuck:	Open	
Cover:	Close	

(28) It rises.

ABC:	Home	Table: Step
Arm:	End	(1/20)
Chuck:	Open	
Cover:	Close	

(29) It returns to the home position and the chuck closes. ASC-120S is ready.

ABC:	Home	Table: Step
Arm:	↑	(1/20)
Chuck:	Open	
Cover:	Close	

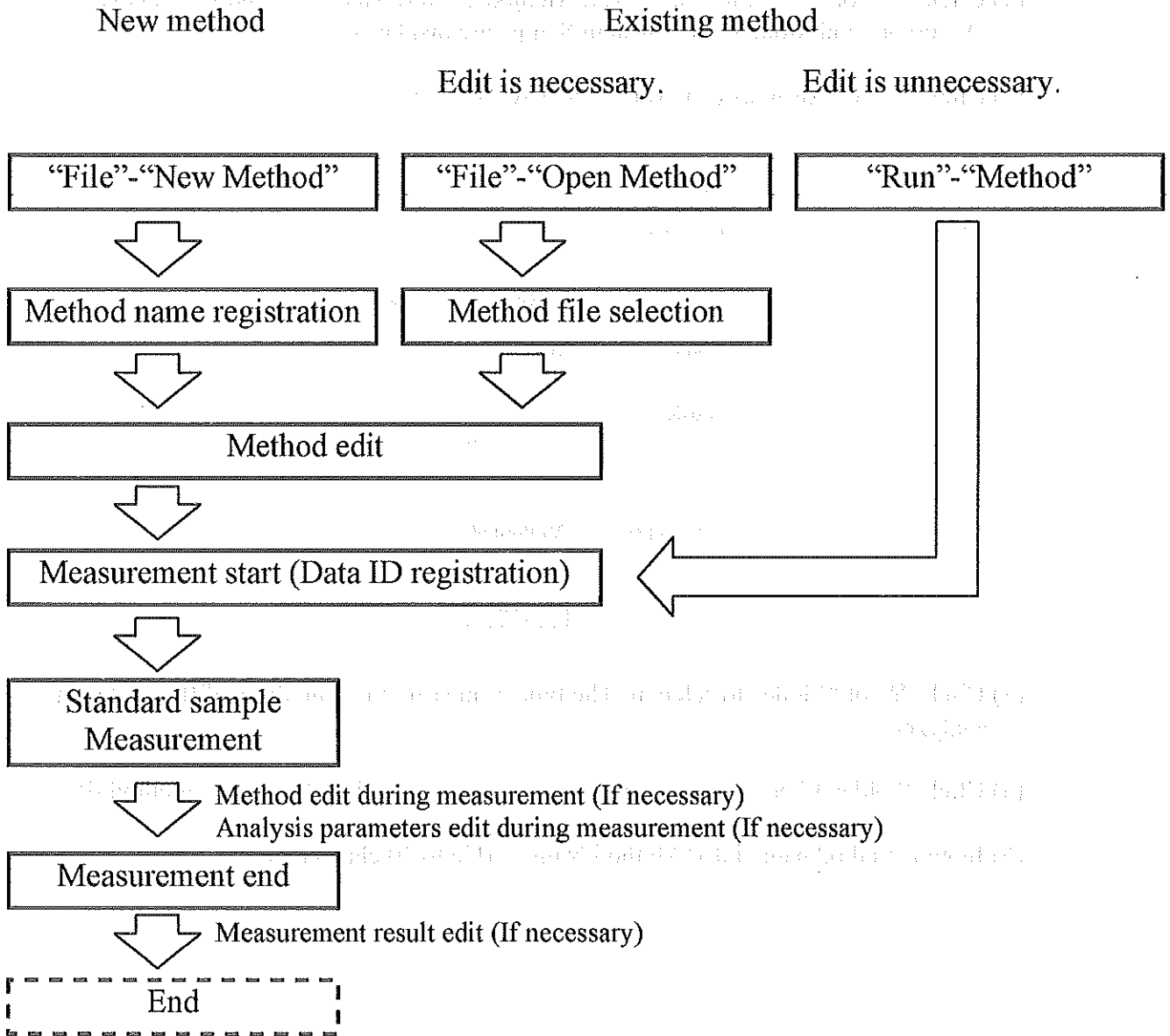
(30) Repeat (8)~(29) by the number of set sample boats.

*** Analysis ***		
Command Waiting...		
(esc) key=■		

5-3. Automatic measurement

5-3-1. Automatic measurement flow


Measurement process is as follows.

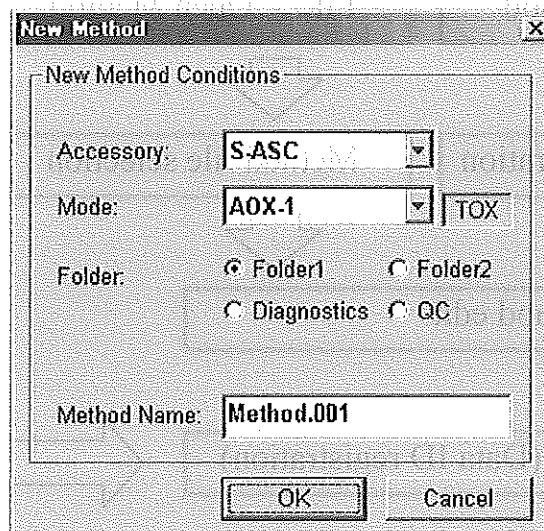


5-3-2. Method edit

Edit the method for automatic measurement. ASC-120S setting when preparing and editing a new method is described here.

* By opening an existing method, it can be edited.

- (1) Click  or click “File” and “New Method”. “New Method” window is displayed. Accessory and Mode set at “System Setup” are displayed.
- (2) Click ▼ of “Accessory” to select “S-ASC” or “ASC-120S”.



- (3) Click ▼ of “Mode” to select it. The type of measurement modes is different by an analyzer.
- (4) Click “Folder 1” or “Folder 2” of “Folder” to select a folder for saving method files.
- (5) Input a method name into “Method Name”. (Up to 20 characters)

(6) Click [OK] button. The method edit window is displayed.

* Window contents are different by an analyzer.

For method contents, refer to the instruction manual for an analyzer.

Only the setting when using ASC-120S is described here.

The screenshot shows a software window titled "New Method - Method001". At the top, "Target" is set to "Calibration" and "ABC Program No." is "1". Below this is the "Edit Calibration" section. "Type" is set to "Calibration". To the right, there is a field for "ppm = 41.4wt" and "Density: 1.0000" with a "Change..." button. The "Concentration" field is "0.00" with a unit dropdown set to "ug/l". The "Std. Volume" field is "0.0" with a unit dropdown set to "ml". The "Mass" field is "0.000" with a unit dropdown set to "ug". On the right side of the dialog, there are buttons for "Add", "Insert", "Copy", "Delete", and "Delete All". At the bottom, there are buttons for "Save", "Save As", "Run Method", and "Cancel". Below the "Edit Calibration" section is a table with the following columns: No., Type, Mode, Col, Sample ID, Mass, S. Size, Density, Dilution, AB. The table is currently empty.

(7) Click ▼ of "Type" to select "Sample".

For solid sample, put a sample to a sample boat and weigh it.

Input sample volume into "Sample Size" and set the unit to "mg".

* By clicking [balance] button when an analyzer is connected to a balance, sample volume is inputted automatically from the balance.

The following operation is required previously.

POINT

When a balance is connected.

- ① Place the boat on the balance and clear the tare.
- ② Put a sample into the boat.
- ③ Press the balance key (Such as <Print> key or foot switch) and transfer the weight into an analyzer.

Caution : Set necessarily the balance unit to "g".


In the system program side, change it to "mg" at the input.

By setting it to "mg" at the balance side, it can be mistakenly regarded as "g" in the system program side.

(8) Edit contents by "Target" and set ABC Program No. by sample volume.

CAUTION

When ASC-120S is used, standard sample volume should be under 30mg or 50 μ l. Too much samples can cause incomplete combustion.

(9) Click  of ABC Program No. right. "ABC Programs" window is displayed.
 * When program No. is known, input it directly into "ABC Program No."
 Proceed to (12).

(10) Click ABC program to select it.

No.	Program	ABC Parameter								Titration Parameter			
		1st Pos. Time	2nd Pos. Time	3rd Pos. Time	End Time	Cool Time	Boat Speed	Delay Time	Ay Time	O2 Time			
1	Toluene 10ul	85	10	110	40	125	30	100	60	20	120	30	600
2	Toluene 20ul	85	10	105	60	125	30	100	60	20	120	30	600
3	Toluene 40ul	85	10	105	100	125	30	120	60	20	120	30	600
4	PCR Resin 30mg	100	20	150	30	200	60	120	60	20	120	30	600
5	Rubber 5mg	100	20	160	40	210	60	120	60	20	120	30	600
6	AOX 40mg	0	0	0	0	0	0	240	60	20	240	30	600
7	Water	0	0	0	0	0	0	180	60	20	180	30	600
8	Paper 2-3mg	150	30	200	50	240	30	120	60	20	120	30	600
9	Lvbrica Oil 30mg	100	20	150	40	185	50	120	60	20	120	30	600
10	Light Oil 20mg	70	20	145	30	185	60	120	60	20	120	30	600
11	Heavy Oil 30mg	100	20	155	50	190	60	120	60	20	120	30	600
12	Acrylic Resin 3mg	100	20	160	30	200	70	120	60	20	120	30	600
13	Epoxy Resin 15mg	100	20	150	30	200	60	120	60	20	120	30	600
20	TEST	70	5	135	5	190	5	5	5	20	30	30	60
29	Boat Prebake	0	0	0	0	0	0	180	60	20	0	30	600
30	H/W TEST	65	5	135	5	145	5	5	5	50	10	120	60

(11) Click [OK] button. Method edit window returns.
 Selected program No. is displayed in "ABC Program No."

(12) Click [Add] button by measurement times. The same measurement contents are added into the below list by clicked times.

When using AQF-100, [Accumulate] button is displayed.

By clicking [Accumulate] button, combusted sample gas is absorbed into the same number tube. After the last sample of the same number tube is absorbed, absorption solvent is injected into an ion chromatography unit.

No.	Type	Mode	Col	Sample ID	Mass	S.Size	Density	Dilution	AD
1	Calibration	AOX-1	1		1.000 ug				2
2	Calibration	AOX-1	1		1.000 ug				2
3	Calibration	AOX-1	1		1.000 ug				2

(13) Like other measurement settings, add them into the list by (7)~(12).

- * For each setting addition and deletion, refer to the instruction manual for an analyzer.
- * For TN-110 and TS-100, plural Sens. can be used in one method.
Refer to “Change Sens. during method measurement” for details.

No.	Type	Mode	Col	Sample ID	Mass	S.Size	Density	Dilution	AB
1	Calibration	AOX-1	1		1.000 ug				2
2	Calibration	AOX-1	1		1.000 ug				2
3	Calibration	AOX-1	1		1.000 ug				2
4	Calibration	AOX-1	1		4.000 ug				2
5	Calibration	AOX-1	1		4.000 ug				2
▶ 6	Calibration	AOX-1	1		4.000 ug				2

Save Save As Run Method Cancel

(14) To start measurement when method edit is completed, click [Run Method] button.
“Method” window is displayed. Next, proceed to 5-3-3. Automatic measurement start.

Change Sens. during method measurement

For TN-110 or TS-100, plural Sens. can be used in one method.

POINT

Set Sens. at standard sample measurement and at sample measurement to the same setting.
When Sens. settings are different, the factor of prepared calibration can't be used.

- (1) Click “System”, “Preference”, “Measurement” tab.
Check [Change Sens. in Method.] and click [OK] button.
 (“Change Sens” is added to “Target” of the method edit window.)
- (2) Open the method edit window and click “Change Sens” of “Target”.
 “Change Sens” edit window is displayed.
- (3) Select Ultra or High or Middle or Low from “Change Sens”.
 Set it in order from a low-concentration sample.
- (4) Click [Add] button. The changed contents of “Sens.” are displayed in the window bottom.
- (5) Select “Target” and prepare the method of measurement by “Sens.” set at (3).
 When changing “Sens.” again, repeat (2)~(4).

5-3-3. Automatic measurement start

Register Data ID and start measurement.

POINT

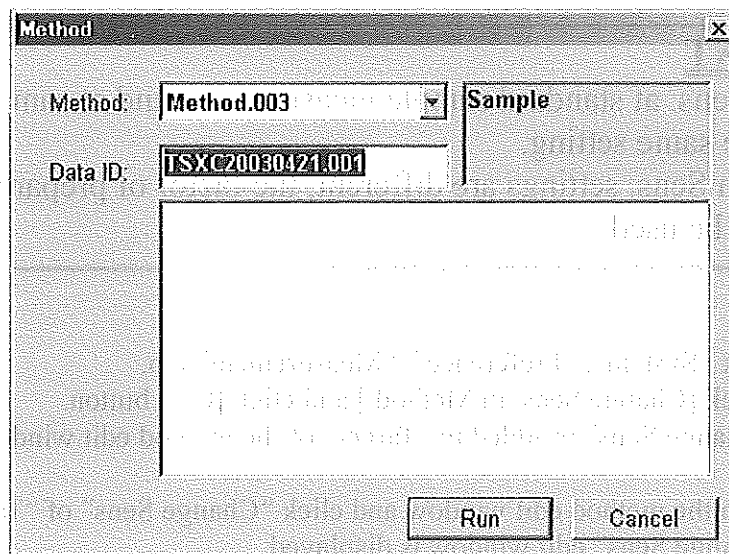
By using existing methods, measurement can start without method edit. By selecting "Run" and "Method", [Method] window is displayed. But, click ▼ of "Method" to select a method.

(1) Input Data ID into "Data ID". (Within 20 characters)

Measurement data can be printed and recalculated by this Data ID.

* As initial setting, "TSXC + measurement dominical year and date + serial number" (Example : TSXC20030421.001) is displayed in Data ID. But this can be changed.

* For some analyzers, when "Change Sens." is set, a new Data ID is added to measurement data after Sens. change. Added indication is added to the main window top. (Original Data ID + serial number Example : TS20000731.001_1)



(2) Click [Run] button. The main window returns.

"S-ASC Home Moving" or "ASC-120S Home Moving" is displayed.

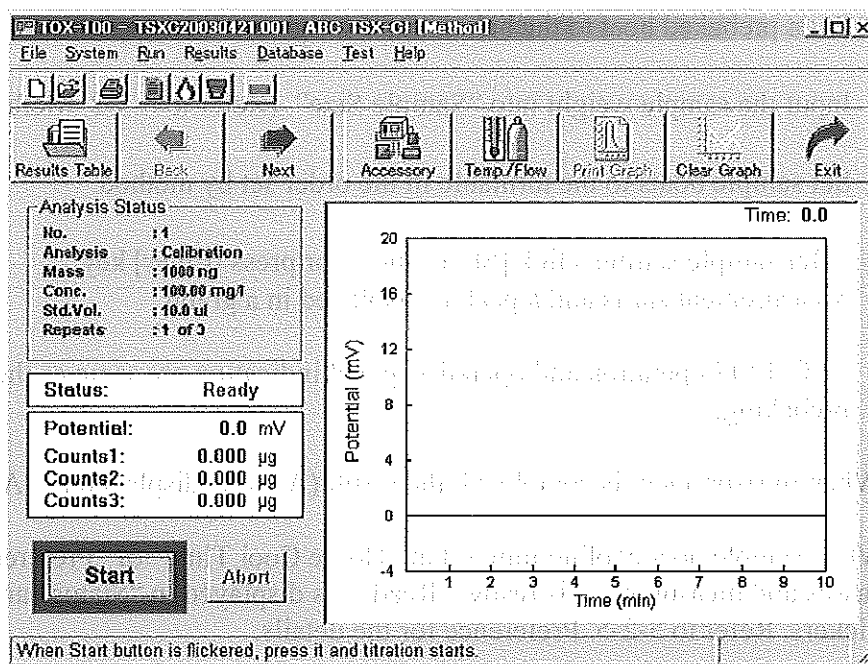
* For some analyzers, blank values and calibration factors can be inputted manually. Input manually after this operation.

* For some analyzers, when setting "Change Sens." in the first line of a method, "Sens. is changing. Click start." is displayed. Click [OK] button.

After a while, measurement is ready.

5-3-4. Automatic measurement


Measurement contents set by a method are displayed in “Analysis Status”.
Check the display and run measurement.



- (1) When the unit is stable and measurement is ready, red “Ready” is displayed in “Status” and [Start] button flickers.

Ready	: Measurement is ready.
Wait	: Waiting before peak detection after measurement start
Sampling	: During signal processing
End	: Measurement end
Busy	: Measurement is unready or ASC-120S is unready

POINT

By clicking , ASC-120S condition can be checked.
Red part is a sample boat position.

- (2) Set sample to a turntable.

When measuring a liquid sample

- ① Prepare empty boats from No. 1 and set a turntable previously.
- ② Take a standard sample of the volume set by a method to a microsyringe.
- ③ After injecting the standard sample with the syringe, click [Start] button or press [Enter] key. Measurement starts and a peak is displayed in a graph.
ASC-120S operation and operation panel indication are same as those of sample boat prebaking.

When measuring a solid sample (Do ① and ② at method edit.)

Put a sample into a sample boat and weigh it. Input sample weight into "Sample Size" and click ▼ of the right to set the unit to "mg".

- ① Put a prebaked boat to the balance and weigh a solid sample.
- ② Input the sample weight into "Sample Size". (Refer to 5-3-2. Method edit.)
- ③ Set sample boats to the turntable in the order set by method.
- ④ After sample setting, click [Start] button or press [Enter] key. Measurement starts and a peak is displayed in a graph.

ASC-120S operation and operation panel indication are same as those of sample boat prebaking.

(3) When measurement is completed, the result (Area) is displayed in "Analysis Status".

When sample boat cooling time set at "Home Cool Time" of "Preference" window passes and measurement is ready, "Ready" is displayed in "Status" and [Start] button flickers. Refer to 5-2-5. Preference for the details.



(4) Measurement after No.2

For a liquid sample

When the cover of a sample inlet box is open, inject standard sample to the next sample boat in the turntable.

* Measurement after No.2 is repeated automatically. Therefore, method addition whenever measurement finishes is convenient.
After method is added, repeat (2) and (3).



To add method, click  or  to display "Results Table" window. After clicking [Open Method] button and adding methods, click [Run Method] button. Refer to the instruction manual for an analyzer for details.

For a solid sample


For measurement after No.2, (2) and (3) are repeated automatically.

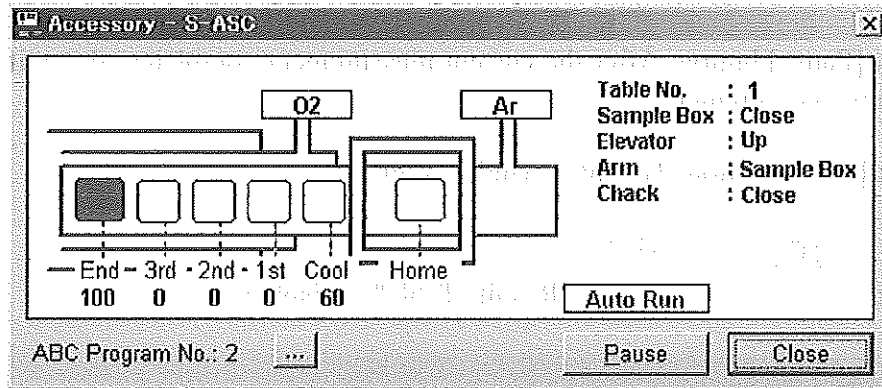
(5) After all measurements, "Completed" is displayed in "Analysis Status".

(6) After method measurement, click  or click "Run", "Operation", and "Exit Run". Measurement ends.

* Measurement can be suspended.

Measurement suspension


Click  or click “System” and “Accessory” to display “Accessory” window.
By clicking [Pause] button, measurement can be suspended.
To resume measurement, click [Start] button.



By suspending measurement, analysis parameters and methods can be changed.

When a trouble occurs during measurement.


CAUTION

When a trouble occurs during measurement, click  to stop the system urgently.

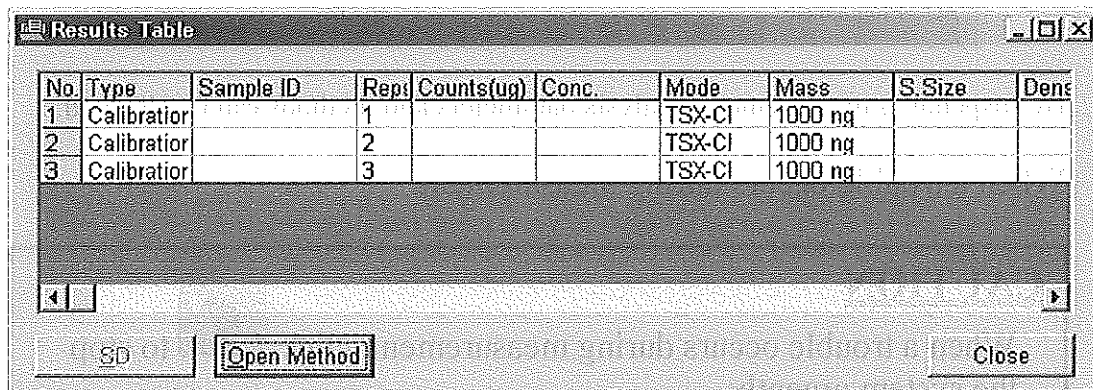
Take measures against emergent stop causes and check that the unit is not wrong.
Measurement can't be continued, so measure again with the same method.

5-3-5. Method edit during measurement

By editing methods during measurement, measurement can be added and deleted.

- (1) Click  or click "System" and "Accessory". "Accessory" window is displayed.
- (2) Click [Pause] button. After the current measurement completes, the unit stops without the next measurement.
- (3) Click [Close] button. The main window returns.

- (4) Click  or . "Results Table" is displayed.

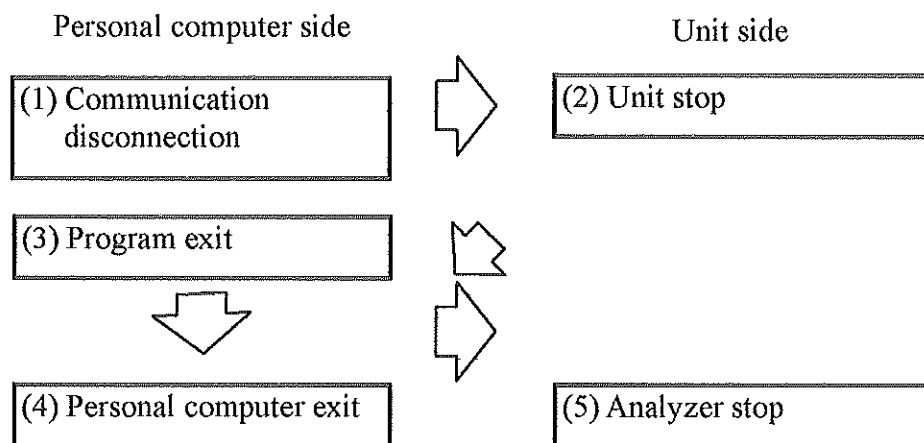


No.	Type	Sample ID	Repl	Counts(ug)	Conc.	Mode	Mass	S. Size	Dens
1	Calibrator		1			TSX-CI	1000 ng		
2	Calibrator		2			TSX-CI	1000 ng		
3	Calibrator		3			TSX-CI	1000 ng		

- (5) Click [Open Method] button. The method edit window is displayed.
- (6) Add and delete methods by the same procedure as method preparation.
* Measured methods can't be deleted.
- (7) Click [Run Method] button in the method edit window.
- (8) Click [Close] button in "Results Table" window.
- (9) To resume measurement, click [Start] button.

5-3-6. Exit

After measurement, stop the unit and exit program as follows.



(1) Communication disconnection

Press <F5> key while pressing <Shift> key or click “File” and “Disconnect”.

The heater switch of the system program, an ozonizer switch, and a titration current switch are off and the communication to an analyzer is disconnected.

* When AQF-100 is used, turn off WS-100 power switch previously.

(2) Unit stop

Turn off the following switches.

- Power switch in the ASC-120S right side
- Another accessory power switches

(3) Program end

Click [×] of the main window upper right or click “File” and “Exit”.

The analyzer system program is ended.

(4) Personal computer exit

- ① Click [Start] button of a taskbar.
- ② Click “Shut Down”. Windows end page is indicated. Shut down Windows.
- ③ Confirm “Shut down the computer?” is selected and click [Yes] button.
The computer power is off.
- ④ Turn off the power switches of a printer and a monitor.

(5) Analyzer stop

POINT

The electric furnace must be cooled with a cooling fan.
After more than 30 minutes from communication disconnection,
stop an analyzer.

- ① Turn off the power switch of the analyzer front panel.
- ② Close Ar and O₂ gas valves.
- ③ To prevent the contamination of sample boats, keep them in a petri dish with tweezers.

10/10/2017

1. The following table shows the number of people who visited the museum in each month.

Month	Number of people
January	120
February	150
March	180
April	200
May	220
June	250
July	280
August	300
September	280
October	250
November	200
December	150

2. The following table shows the number of people who visited the museum in each month.

3. The following table shows the number of people who visited the museum in each month.

4. The following table shows the number of people who visited the museum in each month.

5. The following table shows the number of people who visited the museum in each month.

6. The following table shows the number of people who visited the museum in each month.

7. The following table shows the number of people who visited the museum in each month.

8. The following table shows the number of people who visited the museum in each month.

9. The following table shows the number of people who visited the museum in each month.

10. The following table shows the number of people who visited the museum in each month.

11. The following table shows the number of people who visited the museum in each month.

Section 6: Troubleshooting

Countermeasures against hardware or software troubles in ASC-120S and system program use are described in this section.

CAUTION

When checking the power, pay attention to safety.

No power to ASC-120S

Point	Countermeasure
Is the power switch of ASC-120S ON?	Turn on the power switch.
Is the power connector in the rear of ASC-120S connected?	Connect the power connector firmly.
Is the power plug put in the outlet?	Connect the power plug firmly.
Is the power supplied to the outlet of the laboratory table?	Supply it.
Is ASC-120S power fuse broken?	(1) Take off the fuse holder of the rear panel with a screwdriver. (2) Check the conduction with a tester. (3) If a fuse is blown out, replace it with new one.

Measurement does not start even by connecting ASC-120S to an analyzer.

Point	Countermeasure
Is the power switch of ASC-120S side ON?	Turn on the power switch.
Is the communication cable to an analyzer disconnected?	Insert firmly the signal connector of ASC-120S rear. Insert firmly the option connector of the analyzer rear.
Is "System Setup" run from a personal computer?	Check the system setting by the following procedure. (1) When the main window of the analyzer system program is displayed, press <F5> key. "System Setup" dialog box is displayed. (2) Click ▼ of "Accessory" to select "S-ASC" or "ASC-120S". (3) Click [Transmit] button.
Is ASC-120S operation panel AUTO?	When ASC-120S operation panel is "Command Waiting", automatic measurement is available. For operation panel setting, refer to 5-2-3. Start.

Sensor error is displayed in the operation panel.

When the sensor error is displayed in the operation panel, restart ASC-120S.
 If it is still displayed even after the restart, mechanism can be damaged.
 Contact our local distributors.

Restart procedure

- (1) Turn off ASC-120S power switch.
- (2) Turn on ASC-120S power switch.
- (3) Press [ESC] key and do home positioning.
- (4) Check that the sensor error is not displayed.

Sensor error indication

Table : 11	Cover : 11
ABC : 11	Copen : 1
Arm : 11111	
Chuck : 1	(esc) key=■

When the sensor is wrong, the indication of a wrong place is “0”.
 When the sensor is normal, the indication is “1”.

Indication	Contents	Sensor No.
Table: 1 1 ←	Home sensor	S8
	Step sensor	S9
ABC: 1 1 ←	Home sensor	S1
	End Limit (Over Run) sensor	S2
Arm: 1 1 1 1 ←	Elv. Home sensor	S3
	Elv. Down (turntable side) sensor	S4
	Elv. Down (sample inlet box side) sensor	S5
	Arm Home sensor	S6
	Arm Limit sensor	S7
Chuck: 1 ←	Boat chuck sensor	S12
Cover: 1 1 ←	Sample inlet box close sensor	S10
	Sample inlet box open sensor	S11
Copen: 1 ←	Protective cover sensor	
	(It is not used at present. “1” is displayed.)	

Section 7: Error Messages

This section describes warnings and error messages displayed in a monitor when troubles occur.

CAUTION

Danger and Warning displayed in a personal computer monitor show the danger of serious accidents. When this message is displayed, cope with the trouble immediately.

* ASC-120S error messages are as follows.

ERROR No.	Error messages	Countermeasures
201	ASC-120S CABLE CONNECTION ERROR	The cable between an analyzer and ASC-120S is not connected. Connect it and restart the system.
203	ABC SENSOR ERROR	The sensor position is unknown or the sensor is broken at power supply. Contact our local distributors.
209	SAMPLE BOX OPEN/CLOSE ERROR	The cover of a sample inlet box can't be opened and closed. Contact our local distributors.
211	CHUCK ERROR	A sample boat can't be griped or it was fallen. Collect it and restart the system.
212	AC POWER SUPPLY ERROR	The voltage is wrong. Contact our local distributors.
213	ARM UP/DOWN ERROR	Arm up and down operations are wrong. Contact our local distributors.
214	ARM TURN ERROR	Arm turn is wrong. Contact our local distributors.
215	DIP SWITCH ERROR	Dip switch setting is wrong. Contact our local distributors.
216	H/W TEST ERROR	Telegram is received during the hardware test.
217	COVER OPEN ERROR	The protective cover is removed. Close the cover and the restart system. (It is not used at present.)
218	ABC PARAMETER ERROR	ABC parameters are inappropriate. Check them.
219	TABLE SENSOR ERROR	The table position can't be determined. Contact our local distributors.
220	SENSOR ERROR	The sample boat position can't be determined. Contact our local distributors.

Table 7-1. Error messages

Section 7 : Error Messages

Description of Error	Error Code	Severity
The system cannot find the file specified.	E0000001	Error
The system cannot find the path specified.	E0000002	Error
The system cannot find the network resource.	E0000003	Error
The system cannot find the device or resource.	E0000004	Error
The system cannot find the network resource.	E0000005	Error
The system cannot find the network resource.	E0000006	Error
The system cannot find the network resource.	E0000007	Error
The system cannot find the network resource.	E0000008	Error
The system cannot find the network resource.	E0000009	Error
The system cannot find the network resource.	E0000010	Error
The system cannot find the network resource.	E0000011	Error
The system cannot find the network resource.	E0000012	Error
The system cannot find the network resource.	E0000013	Error
The system cannot find the network resource.	E0000014	Error

Section 8: Maintenance and Inspection

8-1. Unit Inspection

CAUTION

Check the unit every day before the use. If you fail to check it, it doesn't perform properly and serious accidents can occur.

No.	Item	Contents
1	Unit cleaning	Clean the unit if necessary.
2	Gas leakage check	Check the leakage of O ₂ and Ar gases with the flow meter for gas leakage check.
3	Sample boat contamination check	Check that sample boat is not contaminated and devitrified.
4	Check of the packing of a sample inlet box	If it is contaminated and broken, change it with new one.

Table 8-1. Items of daily inspection

Gas leakage check

Check no leakage of supply gas (O₂ and Ar). Refer to 5-2-6. Gas flow setting and gas leakage check for details.

- (1) Connect the ball joint of the flow meter to the outlet of a pyrolysis tube.
- (2) Check the set gas flow and the indicated value of the flow meter.

Sample boat contamination check

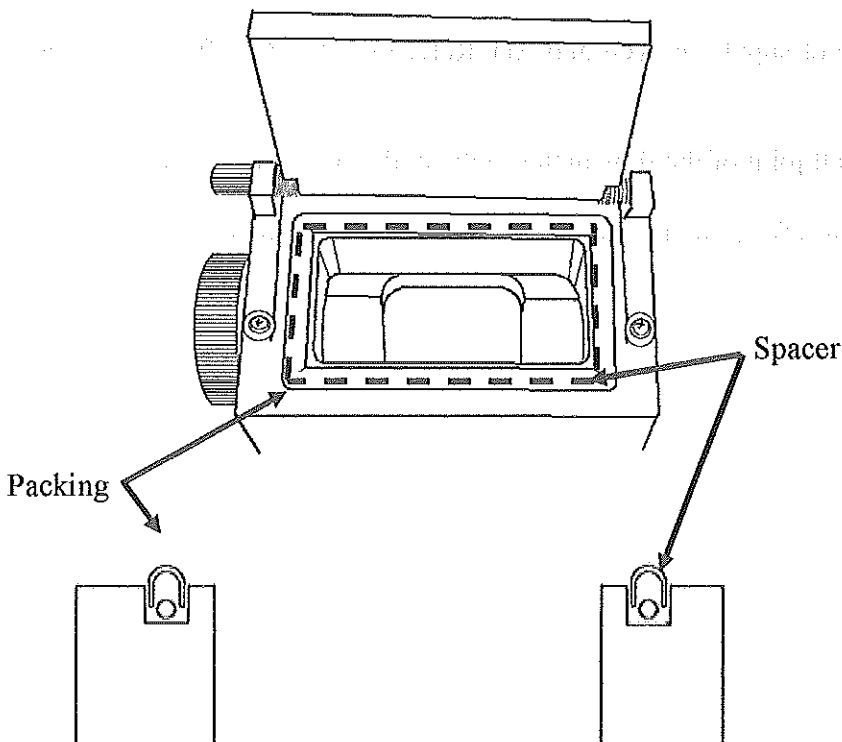
CAUTION (When using an optional sample boat (quartz glass))

Sample boat devitrification deteriorates mechanical strength and causes the breakage. White discoloration of a sample boat is devitrification. When devitrification is severe and fine cracks are in devitrified part, mechanical strength is low. Change the tube immediately.

Check of the packing of a sample introduction box

If it is contaminated and broken, change it with new one.

- (1) Display the test menu by referring to 4-2. ASC-120S start.
Open the cover of a sample inlet box by referring to 4-3-5. Sample Inlet Cov.
- (2) Put 4 attached spacers (PTFE tube) to the slot of a sample inlet box.
- (3) Turn a packing slot to the bottom. Cover spacers with packing and push the packing into the slot with a finger.



Enlarged illustration of the cross section

Illustration 8-1. Setting of packing

8-2. Keeping of ASC-120S

If you don't use ASC-120S for one month or more, keep it under the following conditions.

Cautions in keeping the unit set at a table

- Disconnect a power cable and a gas line.
- Remove the cable to an analyzer.
- Remove ASC-120S from an analyzer.

Cautions about a keeping place

- Room temperature should be under 45°C.
- Free from direct sunlight
- Free from strong vibration and slight continuous vibration
- Free from strong electromagnetic field
- Humidity should be under 80%.
- Free from corrosive gas
- No fire
- Free from much dust

Section 8: Maintenance and Inspection

1. The contractor shall maintain the project site in a safe and sanitary condition at all times during the construction period.

2. The contractor shall be responsible for obtaining and maintaining all necessary permits and licenses for the project.

3. The contractor shall be responsible for the safe handling, storage, and disposal of all materials and equipment used on the project.

4. The contractor shall be responsible for the maintenance and repair of all project equipment and machinery.

5. The contractor shall be responsible for the maintenance and repair of all project vehicles and trailers.

6. The contractor shall be responsible for the maintenance and repair of all project tools and equipment.

7. The contractor shall be responsible for the maintenance and repair of all project safety equipment.

8. The contractor shall be responsible for the maintenance and repair of all project communication equipment.

9. The contractor shall be responsible for the maintenance and repair of all project office equipment.

10. The contractor shall be responsible for the maintenance and repair of all project site office equipment.

Section 9: Specifications

Name	Solid Auto Sampler
Model	ASC-120S
Sample	Solid samples and nonvolatile liquid samples
Sample volume	Under 30mg
Sample boat number	Up to 20 pcs
Boat operation	3 positions + end position + cooling position
Sample boat	Ceramic
Boat cooling	Thermoelectric cooling
Ambient temperature	15~35°C (No change during measurement)
Power supply	AC 100/115/230/240V, 50/60 Hz, 150VA
Dimensions	Approx. 440(W)×360(D)×430(H) mm
Weight	Approx. 20 kg
Operation	Analyzer (Refer to "Introduction" in this manual for analyzer types.) Automatic operation (Start the unit from the analyzer side with a personal computer.) Manual operation (By the operation panel)

Section 9: Specifications

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Section 10: Consumables

10-1. Consumables

No.	Description	Part Number	Quantity	Remarks
1	Guide tube for ASC-120S	TX3RTG	1 pc	
2	S-ASC pushrod	BL1RDL	1 pc	
3	S-ASC sample boat (quartz glass)	TX3SCQ	5 pcs /bag	Transparent
4	S-ASC sample boat (ceramic)	TX3SCX	10 pcs /bag	White
5	S-ASC sample boat (ceramic)	TX3SCY	100 pcs /bag	White
6	S-ASC packing for the sample inlet port	TX3SCP	1 pc	With 4 spacers
7	Outer pyrolysis tube for TOX-100	TX3QPG	1 pc	For TOX-100 and TS-100
8	Inner pyrolysis tube for TOX-100	TX3QPN	1 pc	For TOX-100 and TN110 and ND-100
9	Outer pyrolysis tube (with nails) for TN-110	TN3QPG	1 pc	For TN110 and TOX-100+ND-100
10	Inner pyrolysis tube for TS-100	TS6QPI	1 pc	For TS-100
11	Outer pyrolysis tube for TSV	TS8QPG	1 pc	For AQF-100
12	Inner pyrolysis tube for AQF-100	AQ1QPN	1 pc	For AQF-100
13	Spring for a pyrolysis tube	SX1QSP	4 pcs/set	
14	Fuse 5A/2.5A	FU05MS/ FU25MS	2 pcs/set	

Table 10-1. ASC-120S consumables list

10-2. Parts pictures



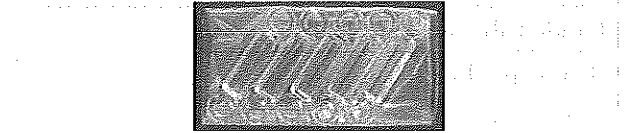
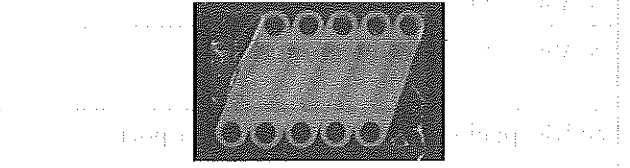
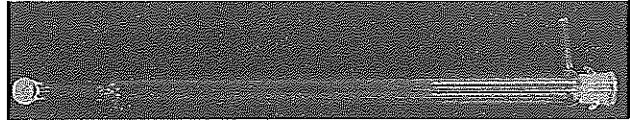
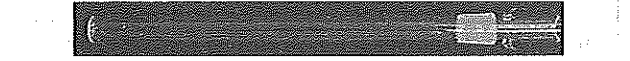
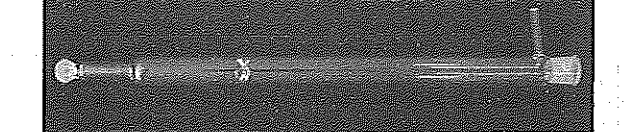
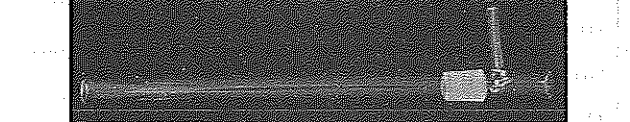
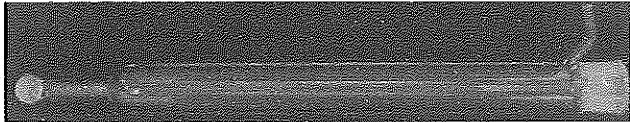
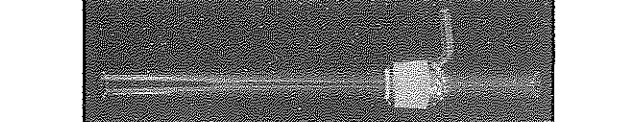
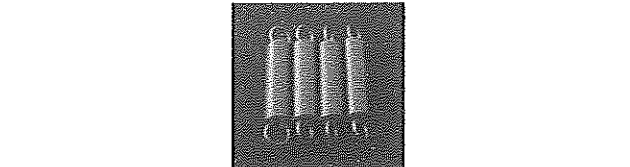
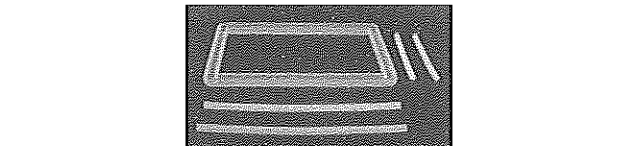
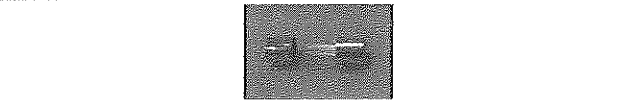
No.	Part Number	Pictures
1	TX3RTG Guide tube for ASC-120S	
2	BL1RDL S-ASC pushrod	
3	TX3SCQ S-ASC sample boat (quartz glass)	
4	TX3SCX S-ASC sample boat (Ceramic 10 pcs /bag)	
	TX3SCY S-ASC sample boat (Ceramic 100 pcs /bag)	
5	TX3QPG Outer pyrolysis tube for TOX-100	
6	TX3QPN Inner pyrolysis tube for TOX-100	
7	TN3QPG Outer pyrolysis tube (with nails) for TN-110	
8	TS6QPI Inner pyrolysis tube for TS-100	
9	TS8QPG Outer pyrolysis tube for TSV	
10	AQ1QPN Inner pyrolysis tube for AQF-100	
11	SX1QSP Spring for a pyrolysis tube	
12	TX3SCP S-ASC packing for the sample inlet port	
13	FU05MS/FU25MS Fuse 5A/2.5A	

Table 10-2. ASC-120S parts pictures