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**Instruction Manual**

# **GAS EXTRACTOR (High Dust Type)**

**TYPE: ZBAS**

# PREFACE

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We are grateful for your purchase of Fuji Electric's Gas Extractor, TYPE: ZBAS.

- First read this instruction manual carefully until an adequate understanding is acquired, and then proceed to installation, operation and maintenance of the gas extractor. Wrong handling may cause an accident or injury.
- The specifications of this extractor are subject to change without prior notice for further product improvement.
- Modification of this extractor is strictly prohibited unless a written approval is obtained from the manufacturer. Fuji Electric will not bear any responsibility for a trouble caused by such a modification.
- This instruction manual shall be stored by the person who actually uses the extractor.
- After reading the manual, be sure to store it at a place easier to access.
- This instruction manual should be delivered to the end user without fail.

Manufacturer: Fuji Electric Co., Ltd.  
Type: Described in the nameplate on main frame  
Date of manufacture: Described in the nameplate on main frame  
Product nationality: Japan

## Request

- It is prohibited to transfer part or all of this manual without Fuji Electric's permission in written format.
- Description in this manual is subject to change without prior notice for further improvement.

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Issued in November, 2019



# CAUTION ON SAFETY


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First of all, read this “Caution on Safety” carefully, and then use the gas extractor in the correct way.

- The cautionary descriptions listed here contain important information about safety, so they should always be observed. Those safety precautions are ranked in 3 levels, “DANGER”, “CAUTION” and “PROHIBITION”.

 <b>DANGER</b>	<p>Wrong handling may cause a dangerous situation, in which there is a risk of death or heavy injury.</p>
 <b>CAUTION</b>	<p>Wrong handling may invite a dangerous situation, in which there is a possibility of medium-level trouble or slight injury or only physical damage is predictable.</p>
 <b>PROHIBITION</b>	<p>Items which must not be done are noted.</p>

<p style="text-align: center;"><b>Caution on installation and transport of gas extractor</b></p>	
 <b>DANGER</b>	<ul style="list-style-type: none"> <li>• This unit is not an explosion-proof type. Do not use it in a place with explosive gases to prevent explosion, fire or other serious accidents.</li> </ul>
 <b>CAUTION</b>	<ul style="list-style-type: none"> <li>• For installation, observe the rule on it given in the instruction manual and select a place where the weight of gas extractor can be endured. Installation at an unsuited place may cause turnover or fall and there is a risk of injury.</li> <li>• During installation work, care should be taken to keep the unit free from cable chips or other foreign objects. Otherwise, it may cause fire, trouble or malfunction of the unit.</li> <li>• For lifting the gas extractor, be sure to wear protective gloves. Bare hands may invite an injury.</li> <li>• The gas extractor is heavy (approx. 20 kg). It should be transported carefully. Otherwise, body may be damaged or injured.</li> </ul>

<b>Caution on piping</b>	
 <b>DANGER</b>	<p>⊙ In piping, the following precautions should be observed. Wrong piping may cause gas leakage. If the leaking gas contains a toxic component, there is a risk of serious accident being induced. Also, if combustible gas is contained, there is a danger of explosion, fire or the like occurring.</p> <ul style="list-style-type: none"> <li>• Connect pipes correctly referring to the instruction manual.</li> <li>• For piping, use a pipe and a pressure reducing valve to which oil and grease are not adhering. If such a material is adhering, a fire or the like accident may be caused.</li> </ul>

<b>Caution on wiring</b>	
 <b>CAUTION</b>	<ul style="list-style-type: none"> <li>• Installation, wiring and piping work must be performed by specialists or your dealer. Incorrect installation may cause a fall device, electric shocks or injury.</li> <li>• Before working, take off wrist watch and other metallic objects to prevent electric shocks.</li> <li>• Wiring is allowed only when all power supplies are turned off. This is required for preventing electric shocks.</li> <li>• Use power source that matches the rating of the unit. Use of power source out of rating may cause fire.</li> <li>• Wires should be the proper one meeting the ratings of this instrument. If using a wire which cannot endure the ratings, a fire may occur.</li> <li>• Be sure to fix the input cables to floors or walls. Careless wiring of cables may cause unexpected injury.</li> <li>• When fixing input cables to floors, use protective materials on the cables. If not used, cables may be damaged which results in a risk of electric shocks.</li> <li>• Be sure to connect cables using input terminals. Careless connection may cause a risk of electric shocks.</li> <li>• Do not touch power terminals with metallic objects or fingers to prevent electric shocks or injury.</li> </ul>

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**Caution on check and maintenance**



**DANGER**

- Before starting work, be sure to put on heat-proof gloves. Work with bare hands or general-use gloves may cause a risk of burns.
- When the funnel is under positive pressure, be careful with the spout of funnel gas to prevent injury or burns.




**CAUTION**



- Daily inspection is important to prevent burning or fire accident.
- When filter is installed in the funnel, the whole unit of the sampler needs to be removed from the funnel for inspection of the filter. Be sure to use a suitable foothold. Use of improper foothold may cause injury.
- Before working, take off a wrist watch, finger ring or the like metallic accessories. And never touch the instrument with a wet hand. Otherwise, you will have electric shocks.
- When the inside of chimney or funnel is positive pressure and the extractor needs to be removed, be careful with high temperature or hazardous gas as it blows out when it is removed.  
Do not get close the extractor to prevent burns or poisoning.
- The gas sampler case and filter are hot. When the filter and O-ring need to be replaced or inspected, turn OFF the power. Be sure to put on protective gloves to prevent burns or injury.
- Do not use a replacement part other than specified by the instrument maker. Otherwise, adequate performance will not be provided. Besides, an accident or fault may be caused.
- Replacement parts such as a maintenance part should be disposed of as incombustibles. For details, follow the local ordinance.



**PROHIBITION**

- Maintenance and inspection must be made only by authorized engineers to prevent electric shocks or fire accidents.

<b>Caution to specialists</b>	
 <b>CAUTION</b>	<p>◎ Before starting maintenance, inspection or repair, be sure to read the instruction manual carefully. Improper work may cause a risk of electric shocks or fire accident.</p> <ul style="list-style-type: none"> <li>• Before starting work, take off wrist watch and other metallic objects to prevent electric shocks or burns.</li> <li>• During work, turn OFF (open) the breaker and the power. Even after power is OFF (open), some parts are still hot. Care should be taken to prevent burns.</li> <li>• Do not touch live parts with wet hands to prevent electric shocks.</li> <li>• The mass of the device is approx. 20 kg. Careless transfer of the device may cause injury.</li> </ul>

<b>Others</b>	
 <b>DANGER</b>	<ul style="list-style-type: none"> <li>• When the gas sampler is installed on a high place or maintenance is required, use a suitable foothold for the sake of safety. Care should be taken to prevent unexpected accident such as a fall.</li> </ul>
 <b>CAUTION</b>	<ul style="list-style-type: none"> <li>• If the cause of any fault cannot be determined despite reference to the instruction manual, be sure to contact your dealer of Fuji Electric's technician in charge of adjustment. If the instrument is disassembled carelessly, you may have electric shocks or injury.</li> <li>• Do not work on rainy days to prevent a risk of electric shocks or a fall of device.</li> </ul>

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# 1. OUTLINE

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The gas extractor is used to sample a gas from a funnel and send it to a gas analyzer. As it is used under very severe conditions, it must provide the following performance.

- Be usable at temperature of a sampling point.
- Have no property to cause reaction with a sample gas or act as a catalyst on it.
- Not be choked by dust, or easily replaceable or cleanable when choked.
- Cause no remarkable sampling delay.

Fuji Electric offers gas extractors meeting these requirements on the basis of long-accumulated experience. This gas extractor has a variety of types such as those with Y-shaped or T-shaped sampling tube depending on the application, and therefore the actual product may differ slightly from the content of this manual depending on the customer's required specification.

Please refer to the individually submitted manufacturing specifications for external drawings, specifications, accessories, spare parts, and consumable parts.

# 2. CONFIRMATION OF DELIVERED PRODUCTS

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Delivered products list

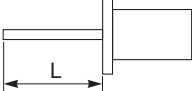
Name of product	Quantity	Remark
Gas extractor main unit	1	
Sampling tube	1	As specified length
Packing (for flange)	1	
Bolt, nut, spring washer, plane washer (M16)	4 each	When using standard flange JIS 10K50AFF
O-ring (G50, G65)	1 each	



### 3. CONFIRMATION OF CODE SYMBOLS AND SPECIFICATIONS

#### 3.1 Code symbols

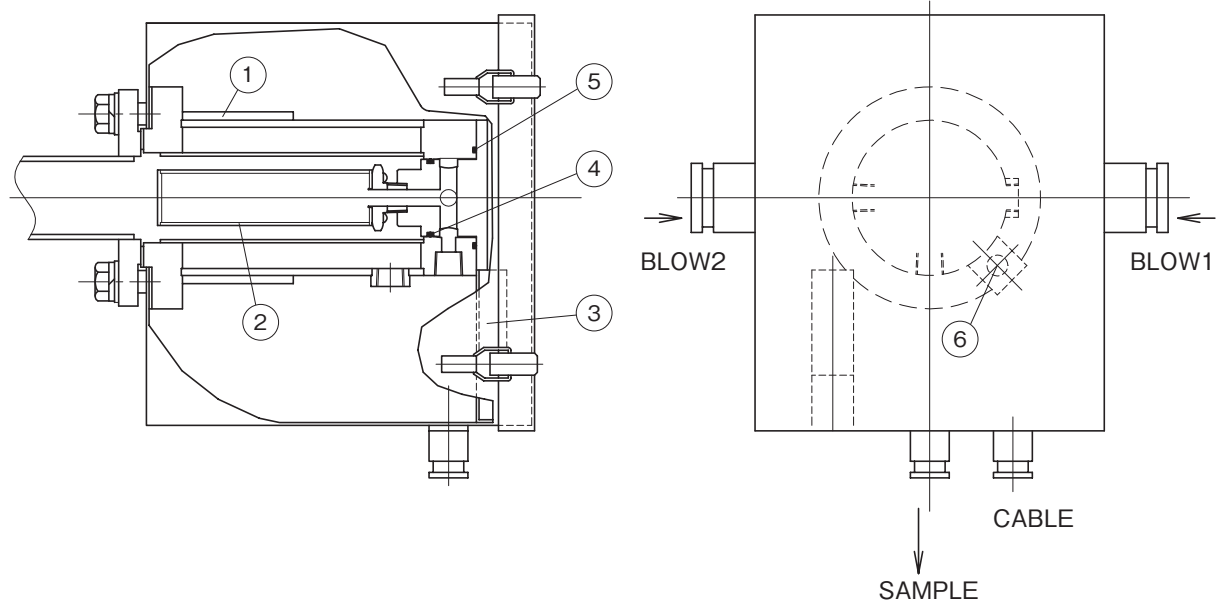
1 2 3 4 5 6 7 8 9 digits									Description	
Z	B	A	S	1	W			0	System Electric heating system (High Dust Type)	
			S							
				1					Structure Indoor/outdoor common	
					W				Material of gas handling parts SUS316, etc	
						Y			Inserting length (L) 0mm 300mm 400mm 600mm 800mm 1000mm 1200mm 1500mm 2000mm As specified	
						A				For general use, gas temperature max. 800°C SUS316
						B				
						C				
						E				
						G				
						H				
						J				
						K				
						Z				
								0	Gas outlet joint None	



#### 3.2 Specifications

System	Electric heating system
Gas temperature	Max. 800°C (Standard specifications)
Material of gas handling parts	SUS316, Byton
Sampling tube	SUS316 (Standard specifications)
Mating flange	JIS 10K50AFF (Standard specifications)
Filter	SUS316 wire gauze, filtering efficiency 10 μm (2 to 100 μm can be used)
Filtering area	About 180 cm <sup>2</sup>
Response time	90% response, about 25 sec at 3L/min
Mass	Approx. 20 kg (without sampling tube)
Sample gas outlet	Rc1/2
Heater	100 V AC, 400 W
Installation	Outdoor installation

## 4. NAMES OF OPERATING PARTS



No.	Name
①	Heater
②	Wire gauze filter
③	Terminal block
④	O-ring (G50)
⑤	O-ring (G65)
⑥	Thermostat

# 5. INSTALLATION

## 5.1 Selection of installation location

Location of sampling the gas for measurement (installation location of gas extractor) requires the following conditions (see JIS K0095, K0103, Z8808)

- ① Gas in funnel is flowing continuously.
- ② Maintenance and inspection can easily be performed.
- ③ Extractor can be installed near gas analyzer (length of gas pipe : less than 20m).
- ④ Extractor can be inserted vertically from the ceiling of funnel or through the side wall for installation.

## 5.2 Mounting of extractor

Mount the extractor observing the following points.

- (1) Sample gas temperature should be within the specified range.
- (2) Mating flange that conforms to the limit of insertion angle of extractor should be prepared.  
Also, protective pipe and installation work should be completed.
  - Standard extractor flange (JIS 10K50AFF,)
  - Limit of insertion angle (Fig. 5-1)

For general use : 90 to 0° (Mount the gas outlet pipe facing downward.)

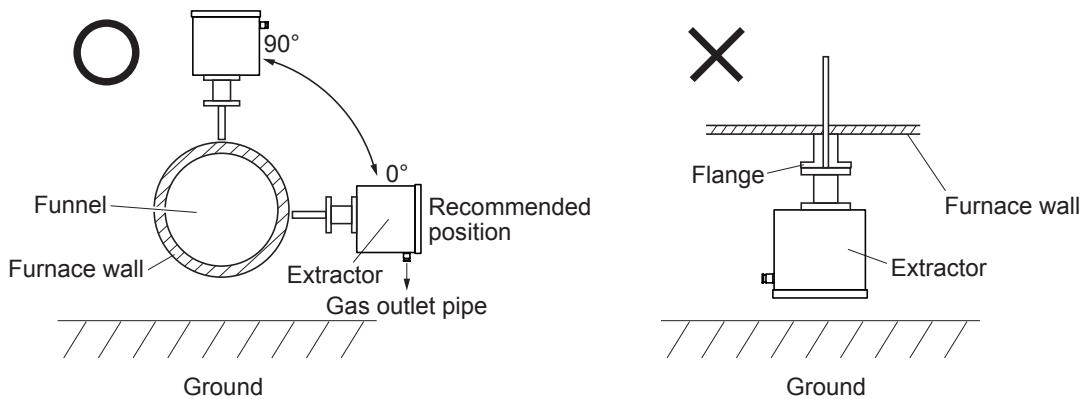


Fig. 5-1 Mounting angle

- (3) When mounting the extractor, the tip of it should be at the center of funnel (more than 300mm apart from furnace wall to prevent leak air from being sucked into the extractor) (Fig. 5-2).

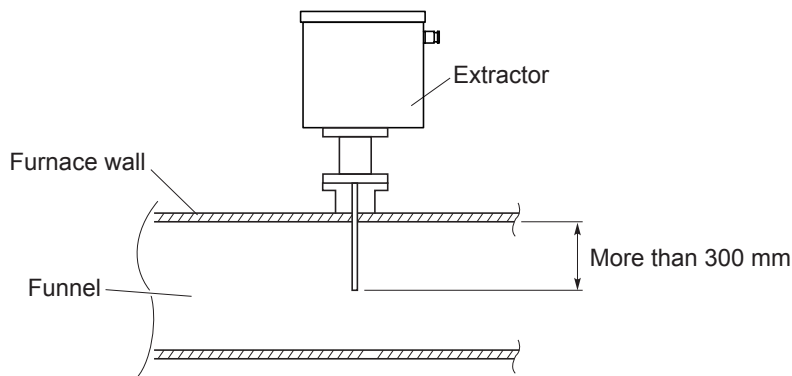


Fig. 5-2 Position of extractor

### 5.3 Sampling tube

- (1) The sample line pipe material must not alter the composition of the sample gas, and must be corrosion resistant.

The recommended material is a Teflon tube. Please prepare pipe joints (for Rc1/2).

- (2) Prepare pipe joints (for Rc1/2) if using pipes such as SUS pipe or SGP pipe.
- (3) SUS pipe is recommended for the blowback line pipe material.
- (4) Connect the pipes to the respective connections as shown in Fig. 5-3.

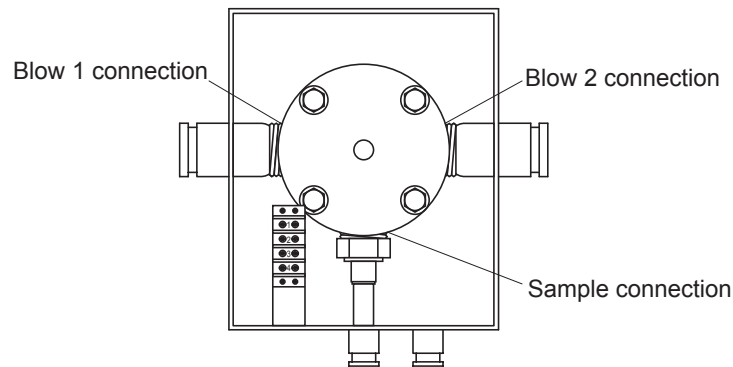


Fig. 5-3

- (5) Refer to Fig. 5-4 for an example for a blowback line pipe.

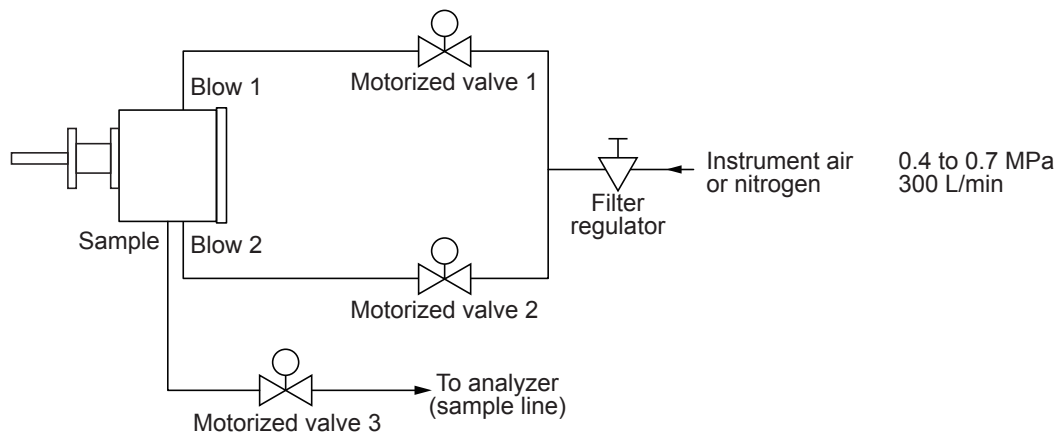


Fig. 5-4

- (6) Ensure that the sample pipe from the gas extractor inclines downward by  $15^\circ$  or more to allow condensed water to flow.

(Sagging is not permitted at any point in the middle of the pipe) Particular attention should be paid to the inclination at the gas extractor exit (see Fig. 5-5).

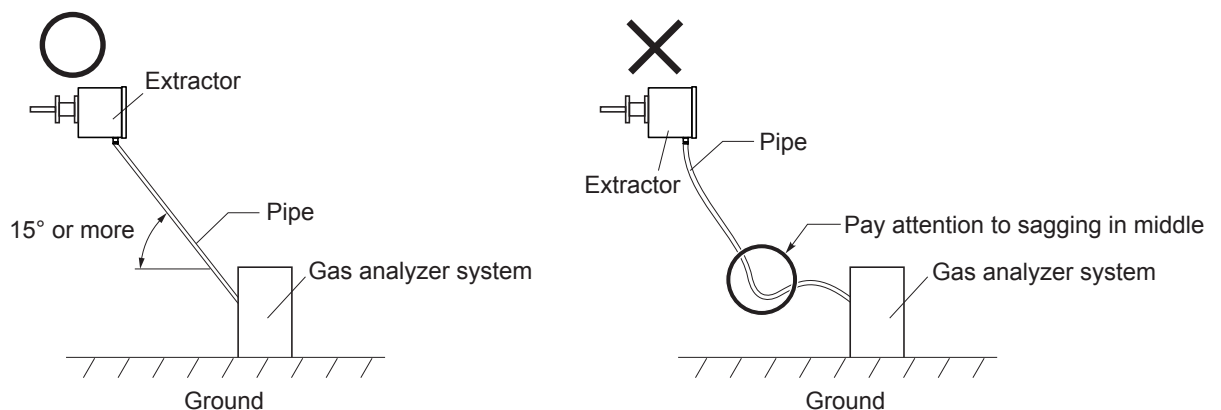


Fig. 5-5

- (7) When using the heating pipe, perform heating work or thermal insulation treatment as required (Fig.5-6). Otherwise, condensation may be caused at the outlet of the extractor.  
If terminal processing is performed inside the gas extractor and only heated parts are pulled outside, heating work will not be necessary.

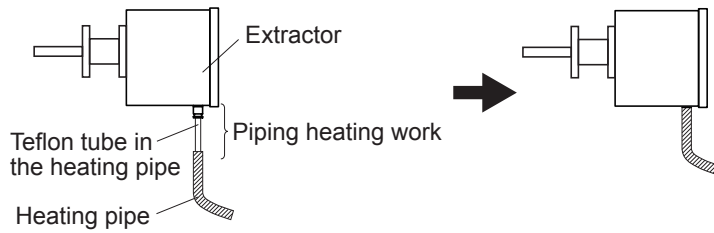


Fig. 5-6

## 5.4 Wiring

Open the gas extractor box, and supply heater power of 100 V AC, 400 W to the internal terminal. When the temperature of the installation location becomes high, heat-proof cables should be used for wiring.

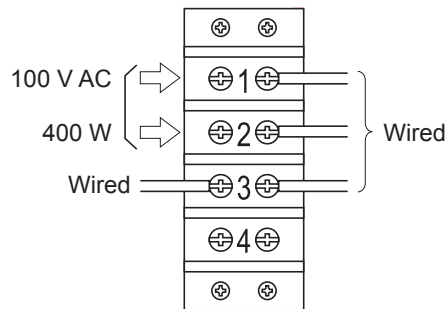


Fig. 5-7 Terminal

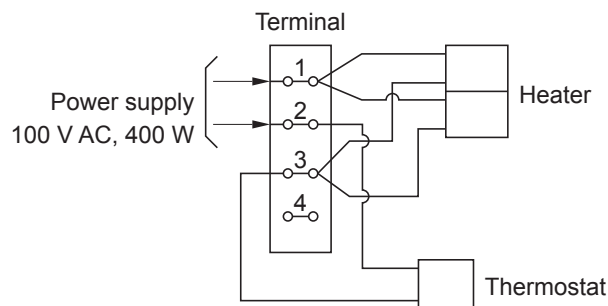


Fig. 5-8 Connection diagram

## 5.5 Blowback time chart example

Perform blowback periodically using instrument air or nitrogen to eliminate dust from the gas extractor. A blowback example is shown in Fig. 5-9.

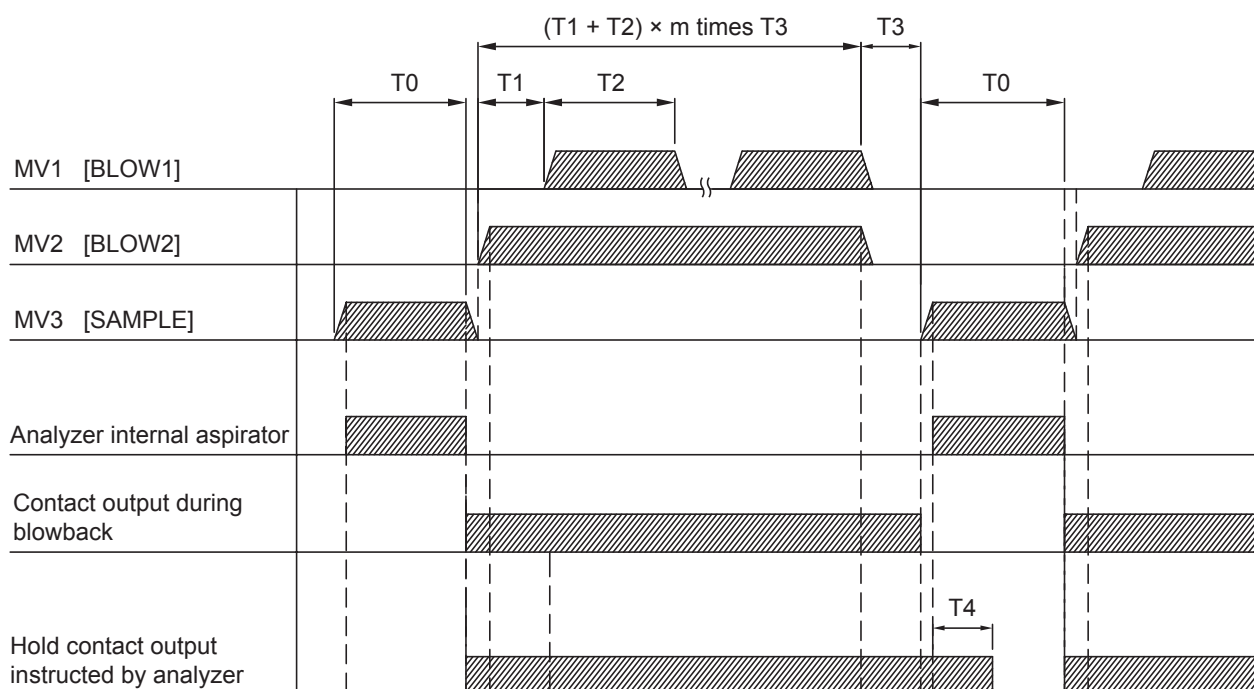


Fig. 5-9 Blowback time chart example

T0 (blowback cycle time)	: 120 minutes
T1 (blow 1: external blow)	: 1 minute
T2 (blow 2: internal blow)	: 1 minute
T3 (blow pressure release time)	: 1 minute
T4 (hold extension time)	: 5 minutes
m (external blow blowback count)	: 2 times

The above time chart is an example.

The time must be set to an appropriate value based on the measured gas conditions, analyzer specifications, and operation state.

## 6. OPERATION

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Before operating the extractor, be sure to observe the following points.

- Preparation for operation

- ① Make sure that all the cables are connected correctly.
- ② Turn ON the power.
- ③ Suck in the sample gas after the extractor is warmed up for about 1 hour.
- ④ While the furnace is being dried up, warm up the extractor but do not suck in the sample gas.

## 7. INSPECTION AND MAINTENANCE

### 7.1 Daily inspection

Check to make sure that extractor is properly warmed up.

### 7.2 Periodical inspection/maintenance (standard)

Item	Remark
Cleaning of wire gauze filter: Replacement once every several days to 3 months, or when use is no longer possible	Clean or replace according to the amount of dust deposits in exhaust gas.
Replacement of O-ring or packing: (at inspection/replacement of wire gauze filter), Once/6 months for high temperature, once a year for general use	_____

### 7.3 Wire gauze filter removal method

- ① Turn OFF the power to the gas analyzer gas aspirator.
- ② Turn OFF the gas extractor power, open the gas extractor unit case cover, and wait until the unit drops to a temperature at which it can be touched by hand (50°C or lower).  
Note) Wear heat-resistant gloves, etc. when carrying out work. Failure to do so may result in burns.
- ③ Remove the hexagonal head bolt.
- ④ Connect the removal fitting provided to the screw hole in the center of the head (filter unit), and secure with the removal fitting nut. Once secured, pull out the head.
- ⑤ After replacing the filter and O-ring, reassemble using the opposite procedure to that described above. (The bolt tightening torque should be 12.5 N·m.)

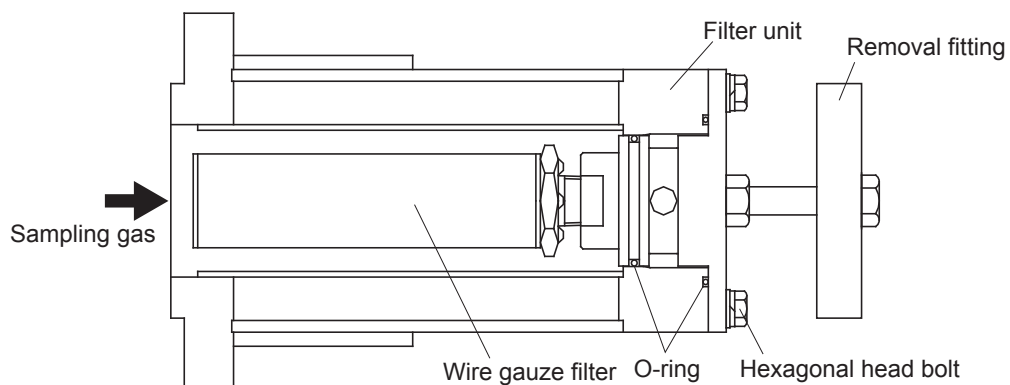


Fig. 7-1 Wire gauze filter removal

### 7.4 Cleaning of wire gauze filter

- ① Put the filter in water while it is still hot, and remove dust deposits.
- ② Wash the front and rear of the filter with compressed air and water pressure.
- ③ Dry the filter fully and then mount it back.



## 8. MAINTENANCE PARTS

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When maintenance parts are required, inform us of their arrangement code or code No. shown in the following tables.

Table of spare parts for 1 year use

Name of parts	Quantity	Arrangement code
Wire gauze filter (10 μm)	1	ZBN5BS12
O-ring (JIS G50)	1	
O-ring (JIS G65)	1	

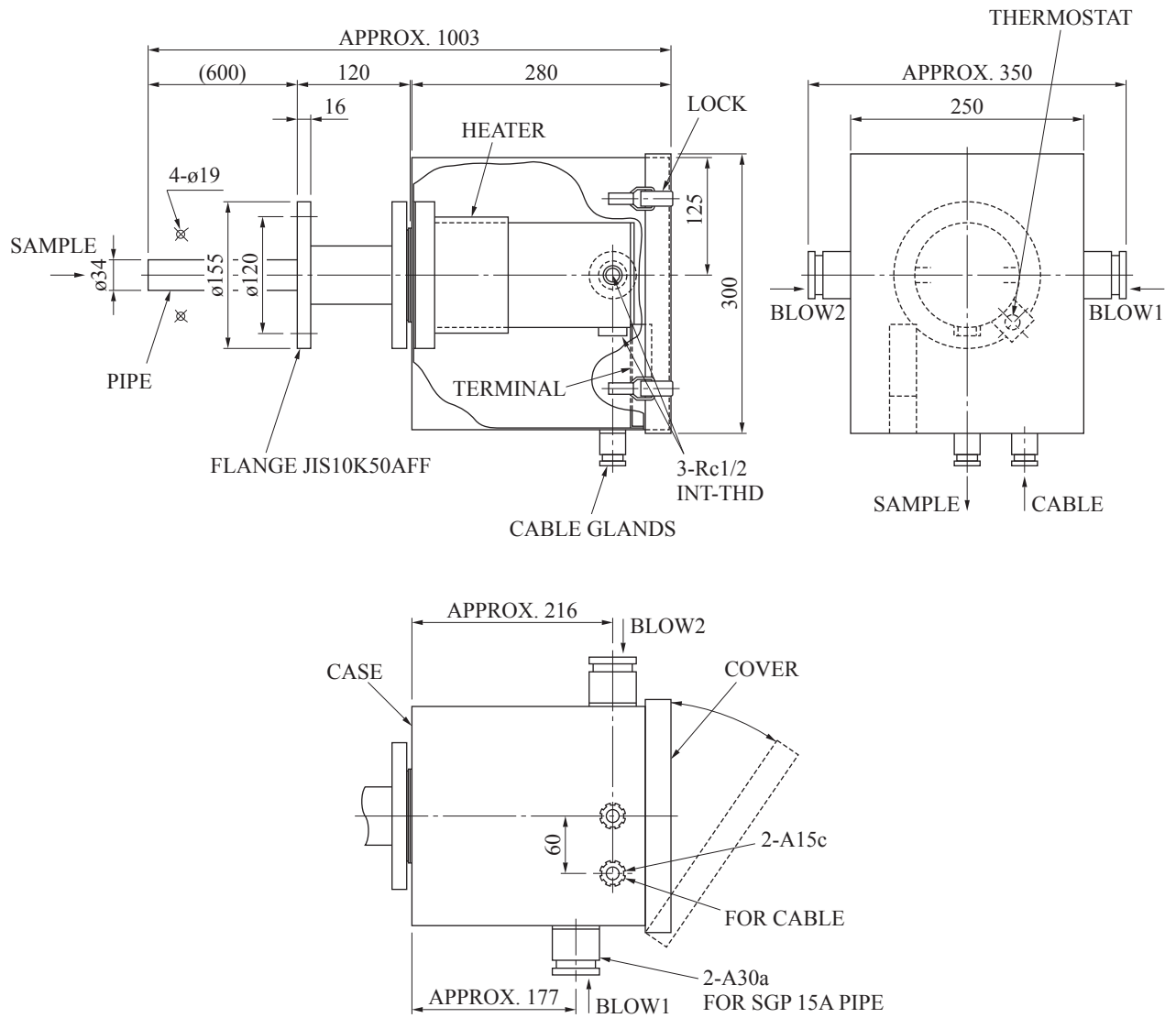
Table of maintenance parts

Name of parts		Code No.	
Wire gauze filter (10 μm)		ZBNS1112	
Packing (for flange)	JIS 10K50AFF	Flange (for general use)	TK7H4238P4
		Flange (for high temperature)	TK7C8038P4
O-ring (G50)	10pcs. of 1 case	ZBNS1122	
O-ring (G65)	10pcs. of 1 case	ZBNS1132	

# 9. OUTLINE DIAGRAM

## 9.1 Gas extractor

(Unit : mm)



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