



Instruction Manual

FULL AUTOMATIC EXTINGUISHING SYSTEM

ABLE

Automatic Fire Extinguishing System for Industrial Machines

YAC-3 YAC-7

CONTENTS

1. Installation Procedure	2
2. Accessories and Spare Parts.....	2
3. Installation of Cabinet	3
4. Installation of Nozzles and Bimetal Type Thermal Detectors.....	5
5. Copper Piping Work	6
6. Wiring Work.....	7
7. Testing and Setting	9
8. Check Sheet	10
9. Operation Flow Chart	11
10. Circuit Block Diagram	11
11. Daily Operation.....	12
12. Specifications	13
13. Construction Drawings	14

Follow the precautions given below for your safety:

Before using the unit, read this "Instruction Manual" thoroughly to ensure proper operation.

This "Instruction Manual" provides safety precautions as **⚠**WARNINGS and **⚠**CAUTIONS that must be observed without fail to ensure safe operation of the unit. Make sure to follow these precautions in order to prevent the injury to yourself and others as well as property damage.

After reading the manual, be sure to keep it at a place so that it can be referred to at anytime.

⚠ WARNING Failure to observe the warning may result in death or serious injury.

In case of fire, leave the area immediately.

Burns or other accidents may occur due to dispersion of burning objects or fire extinguishing agent.

In case of installing an exhaust air system, arrange the system in such a way that it may be stopped (duct closed or fan stopped) at the same time with startup or fire detection.

Fire extinguishing may be prevented because of discharge of the fire extinguishing agents.

⚠ CAUTION Failure to observe the caution may result only in slight or intermediate injury, or property damage.

Caution in case of mounting:

- Do not install the unit at a place where drops of water or of oil or metal power might get inside the control panel.
- Do not install the unit at a place that is subject to vibration or mechanical shock.
- Do not install the unit at a place with temperatures exceeding the service range (0~+40°C), or where condensation occurs.
- Install the unit carefully so as not to deform the cabinet.
- Be careful not to allow any foreign objects to get inside the pipe, and also make sure to fasten the mounting screws.
- Test the detectors and individual remote alarming device according to the directions in this Instruction Manual.
- Be sure to attach temperature seals only after completion of testing.

Caution in case of installation and maintenance control:

- Make sure that the POWER indicator lamp is lighted.
- Periodically check that the mass of the chemical agent in the storage container is within the specified range (less than -10% the rated amount).
- Make sure that the copper pipe is not deformed and that the nozzle is mounted at the set position.
- Make sure that there is no damage to the electric wire sheath.
- Be careful not to press the MANUAL START button except in case of fire.
- In case of fire, keep on pressing the MANUAL START button until the START lamp is lighted and the alarming buzzer continuously sounds.
- Make sure that detectors are mounted at the set positions and that no foreign objects are attached on thereon.
- Be sure to replace the gas generator and detectors that have been used for five years after installation.
- Arrange to have a fire extinguisher maintenance company perform periodic checks (once per six months).

Treatment and caution after use:

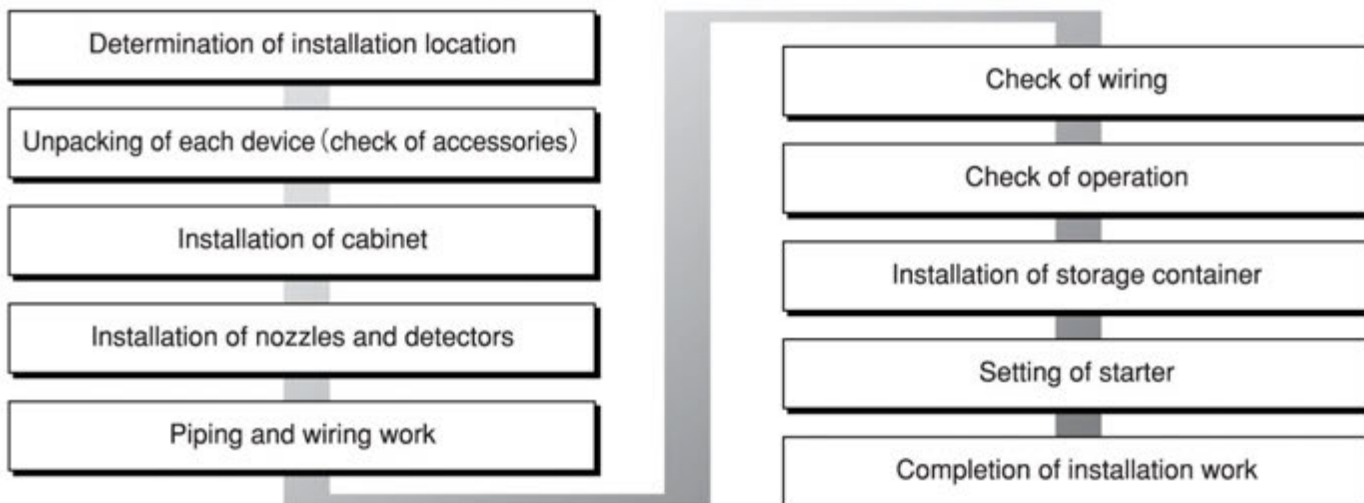
- After discharge, completely wipe the extinguishing agent off the surface of any objects and allow them to thoroughly dry.
- Keep people away from the target objects while the extinguisher is discharging. If the target objects have covers, do not remove them until extinction of the fire is confirmed.
- After discharge, turn OFF the power source of the control panel and check the safety of the unit after performing the treatment of remote alarming functions.
- After starting the unit, thoroughly clean the nozzle and the pipe inside.
- After using the unit, request your fire extinguisher maintenance company to perform necessary replacement of the extinguishing agent, gas generator and nozzle, as well as functional testing of the unit.

⚠ OTHERS

As for details on proper installation and inspection of the unit, refer to the Instruction Manual to ensure its maximum overall system performance.

1. Installation procedure

Perform the installation work according to the procedure given below:



2. Accessories and Spare Parts

Accessories		Quantity	
		Type YAC-3	Type YAC-7
①	Bimetal type thermal detector (BTA-1R) , with connector	<input type="checkbox"/> One piece	<input type="checkbox"/> One piece
②	Temperature seals	<input type="checkbox"/> Two pieces	<input type="checkbox"/> Two pieces
③	Nozzle (with mounting bracket)	<input type="checkbox"/> One set (for type YAC-3)	<input type="checkbox"/> One set (for type YAC-7)
④	Copper pipe, 5 m	<input type="checkbox"/> One piece (φ8Xφ6)	<input type="checkbox"/> One piece (φ10Xφ8)
⑤	Copper pipe retaining bands	<input type="checkbox"/> Five pieces (for φ8)	<input type="checkbox"/> Five pieces (for φ10)
⑥	Pipe band fitting screws for copper pipe fixing (with W, SW) , hexagon nuts	<input type="checkbox"/> Five sets	<input type="checkbox"/> Five sets
⑦	Elbow joint	<input type="checkbox"/> One piece (for φ8)	<input type="checkbox"/> One piece (for φ10)
⑧	Straight joint	<input type="checkbox"/> One piece (for φ8)	<input type="checkbox"/> One piece (for φ10)
⑨	Spare rings for copper pipe joint	<input type="checkbox"/> Five pieces (for φ8)	<input type="checkbox"/> Five pieces (for φ10)
⑩	Rubber stopper	<input type="checkbox"/> One piece (for φ8)	<input type="checkbox"/> One piece (for φ10)
⑪	Instruction manual	<input type="checkbox"/> One set	<input type="checkbox"/> One set
⑫	Delivery check sheet	<input type="checkbox"/> One set	<input type="checkbox"/> One set

Spare parts		Quantity
①	Fuse (250 V, 0.5 A)	<input type="checkbox"/> One piece
②	Plug housing (ELP-02V, ELP-03V, ELP-06V)	<input type="checkbox"/> Each one piece
③	Socket contacts (LLF-41T-P1.3E)	<input type="checkbox"/> 11 pieces

※Spare parts are attached on the control panel.

3. Installation of Cabinet

Remove the storage container from the cabinet, and secure the cabinet to the mounting surface through the mounting holes on the back cabinet.

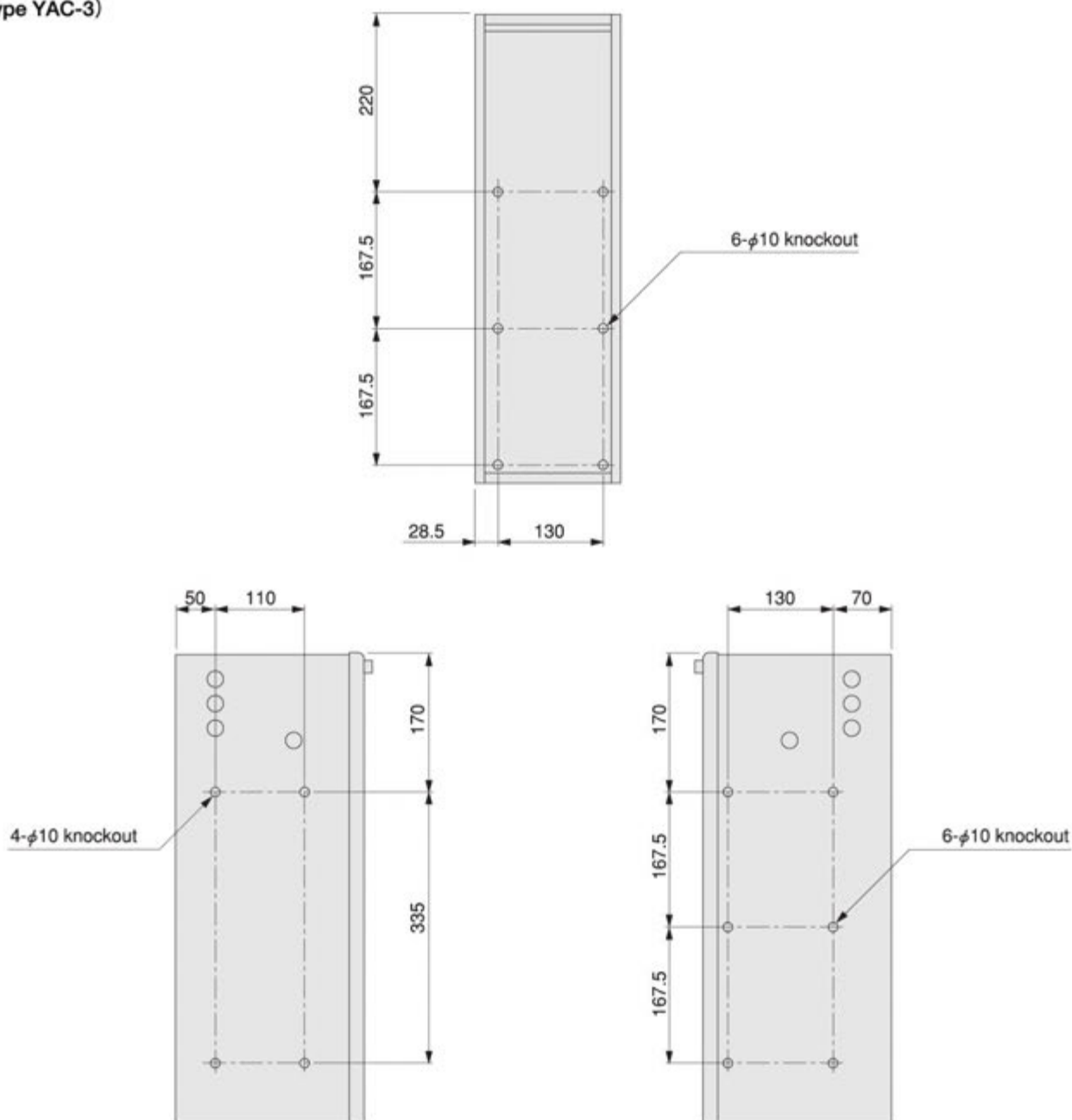
Mounting position

Install the cabinet:

- at a position allowing for easy operation of the MANUAL START button.
- so that the length of the copper pipe to the nozzle will be 5 m or less.
- at a position where it is not subject to water splash.
- at a position to facilitate daily inspection.

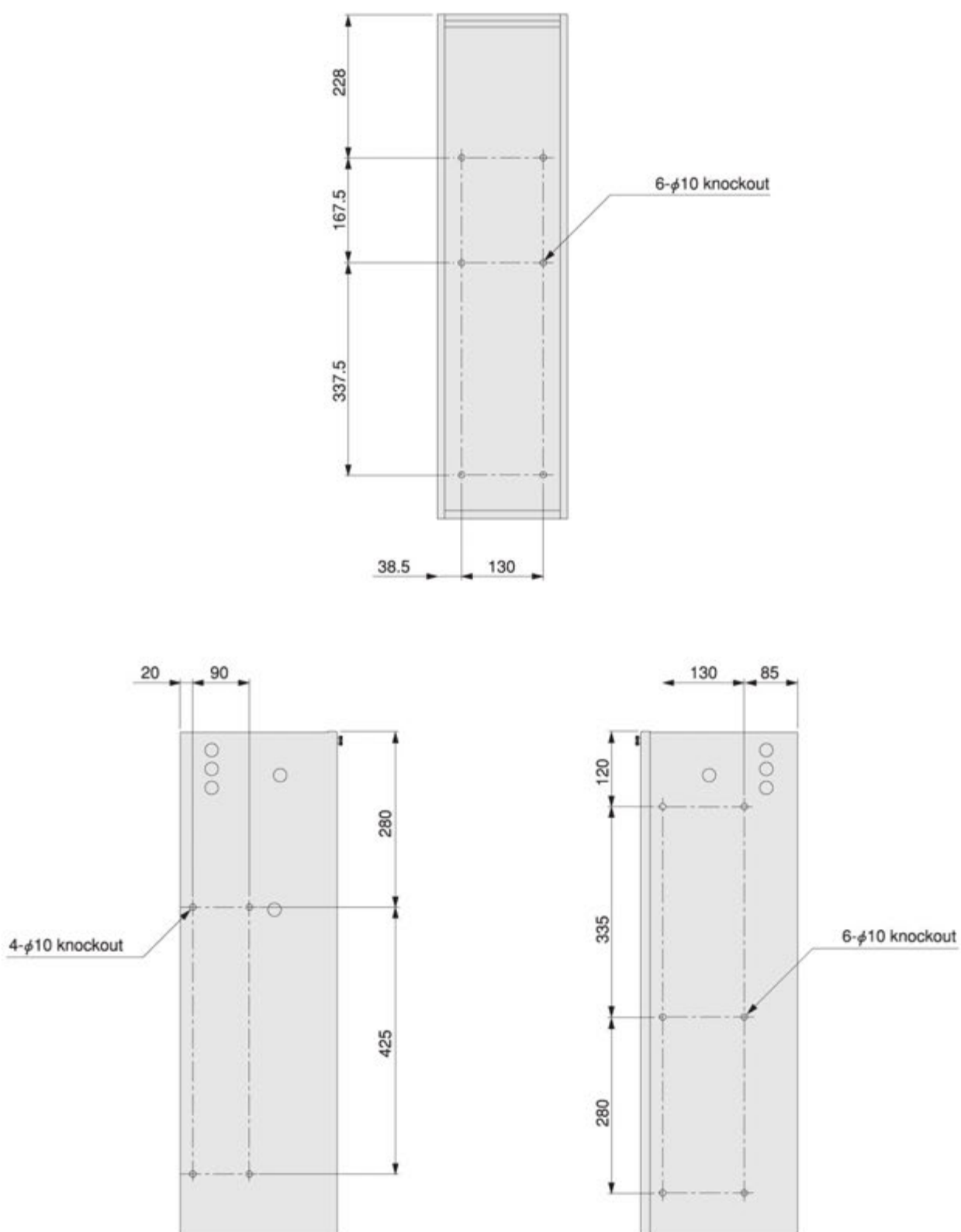
Dimensions of mounting holes of cabinet
(Type YAC-3)

(Unit: mm)



Dimensions of mounting holes of cabinet
(Type YAC-7)

(Unit: mm)

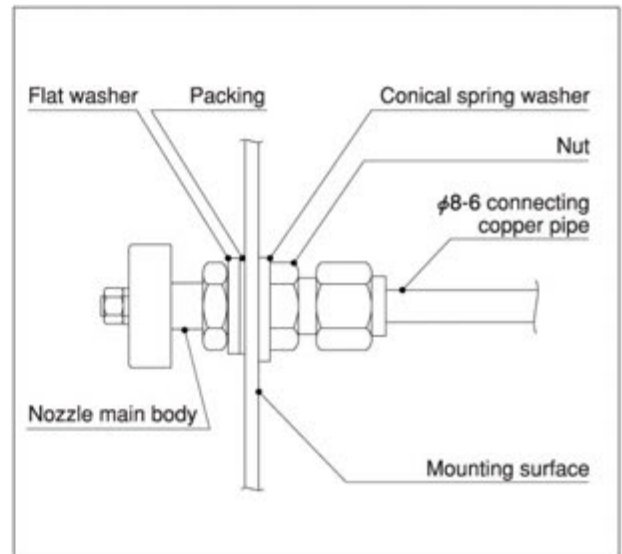


4. Installation of Nozzles and Bimetal Type Thermal Detectors

1. Installation of Nozzles

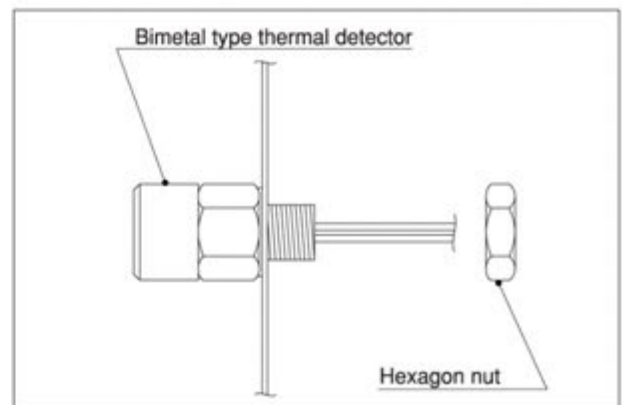
- ① In the basic configuration, install one nozzle per cabinet.
- ② Install it at a position appropriate for fire extinguishment.
- ③ Install the nozzle at a height so that it will be within 1m from the target object.
- ④ Make a hole (15mm in diameter for type YAC-3, 18mm in diameter for type YAC-7) on the mounting surface.
- ⑤ Secure the nozzle using the washers and nut attached on it (refer to the right figure) .
- ⑥ If unable to secure it, support it at an adjacent point.
- ⑦ When installing additional nozzles, two nozzles per cabinet in total are available.

Additional nozzles are optional.



2. Installation of Bimetal Type Thermal Detectors

- ① One bimetal type thermal detector (BTA-1R) is provided per cabinet. (When installing additional detectors, refer to "6. Wiring Work.")
- ② Install the detector at a location as close as possible to areas where fire is likely to occur, or at a location to be in contact with flames.
- ③ If the detector can not be installed at a location as described above, and also when a machine tool is surrounded by protective barriers and the room has a low ceiling, then install it near the ceiling.



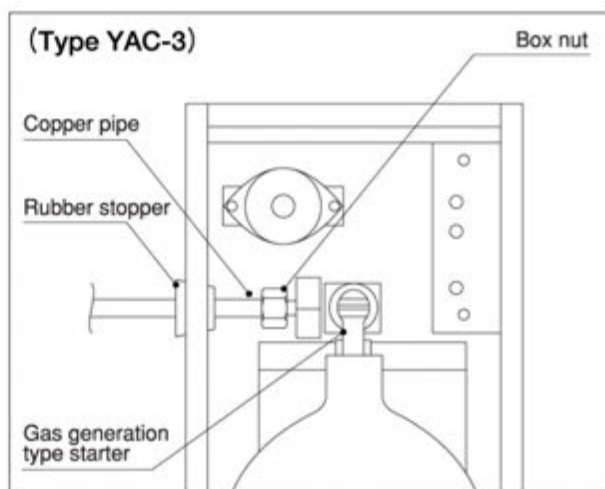
5. Copper Piping Work

1. Piping

- ① The JIS H 3300 copper pipe that is included (external diameter 8mm, inner diameter 6mm for type YAC-3; external diameter 10mm, inner diameter 8mm for type YAC-7) should be used.
- ② The distance between the cabinet and one nozzle should be 5m or less.
- ③ Curves should be processed using tools such as a bender (up to eight curves are allowed).
- ④ Secure it with pipe bands provided.

2. Connection of Pipe to Cabinet

- ① Remove the knockout used for the cabinet, insert the attached rubber stopper into the knockout and insert the copper pipe through the hole of the stopper, and then plug it into the box nut of the connecting metal piece.
- ② Tighten the box nut to a torque equal to 1,080 to 1,270 N·cm. Otherwise, tighten it manually until it can not be turned smoothly, and then further tighten it one and a quarter to one and a half turns.



<In case of type YAC-7>

- Set the storage container such that the starter may face toward the back of the cabinet.
- Align the container valve connecting piece and the main body top to the direction of the copper pipe (left or right).

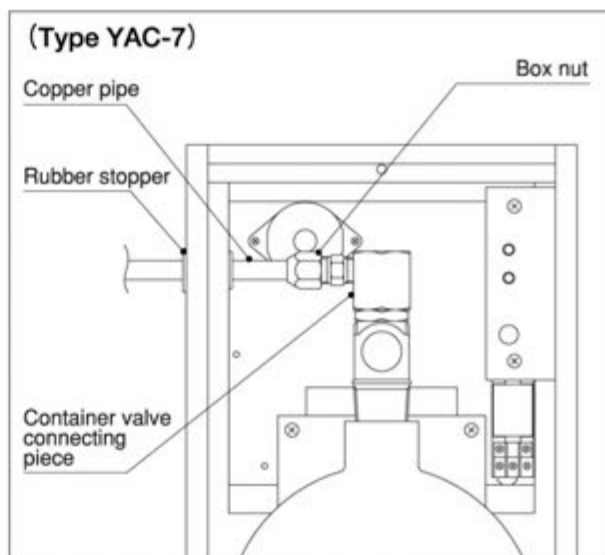
Method:

- ① Fully tighten the main body top manually.
- ② Align the direction while gradually loosening the main body top.

(Note)

Since too much loosening of the main body top may result in leakage of the extinguishing agent during discharge, do not loosen it by more than one turn after full tightening.

When loosening the main body top, also take care so that the main body bottom may not be loosened.



6. Wiring Work

1. Wiring

(1) Wiring work of detectors

Use 0.5mm² electric cables (heat resistant cables conforming to No.4 of the Notification by the Fire and Disaster Management Agency of the Ministry of Public Management, Home Affairs, Posts and Telecommunications) or equivalent. Insertion type pin terminals (PC2005 from Nichifu) should be applied for 0.5 to 0.75mm² electric cables, where NH-5 manual crimping tool (Nichifu) or equivalent should be used.

(2) AC input power source work

- ① The rated AC input power source is 200 V.
- ② Receive the AC input power source from an exclusive breaker which can always supply primary power.
- ③ Perform the wiring work according to the indoor wiring regulation.

(3) Wiring work for remote alarming devices

A number of connectors for remote alarming of equipment stop and power failure are provided, which may be used as appropriate for remote alarming of fire as well as stop of the exhaust air system and the equipment.

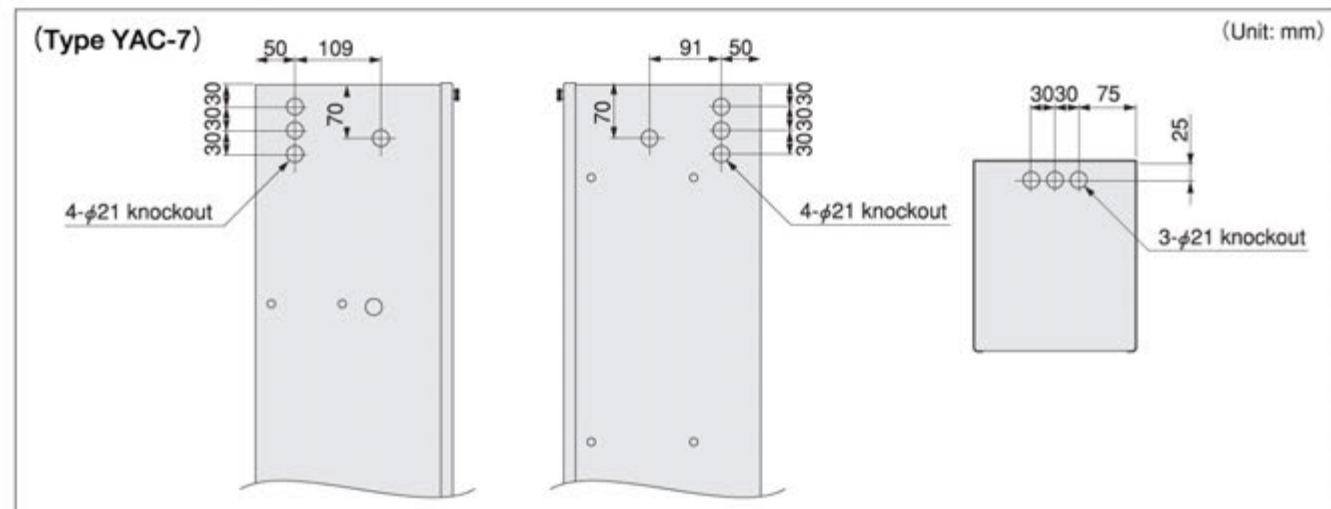
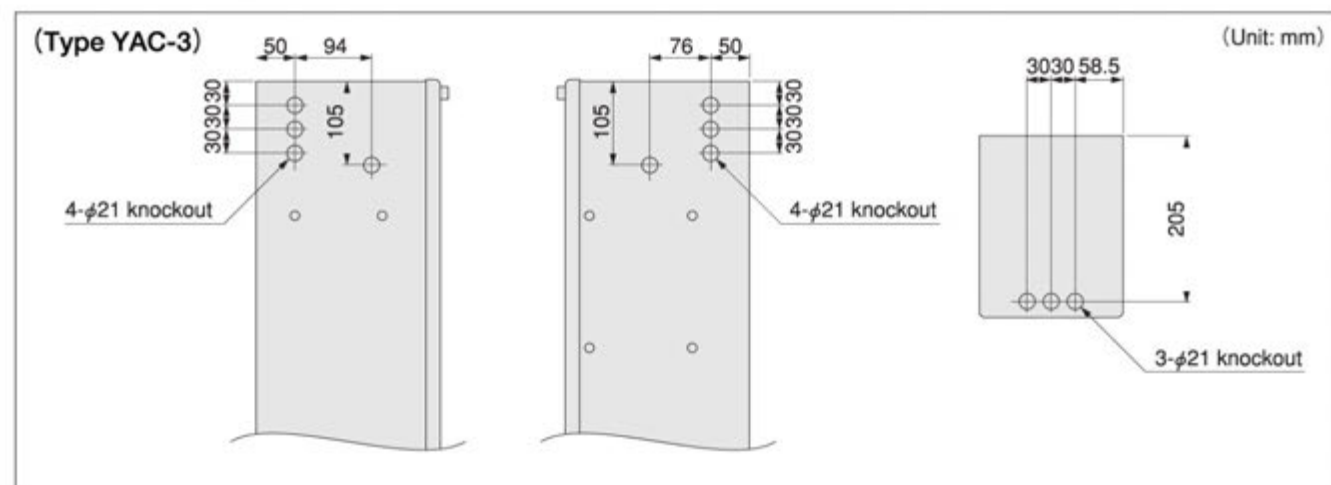
(4) Connector wiring work

Perform the wiring work using connectors (CN-1 to 3) (JST) as specified in the table.

Contact type	LLF-41T-P1.3E
Size of applicable cables	0.5~1.25mm ²
Cable sheath outer diameter	1.9~3.4mm
Manual crimping tool	YC-203
Extraction device	LEJ-13

2. Piping and Wiring

- ① Wiring should in principle be protected by conduit tubes.
- ② To pull conduit tubes out of the cabinet, use its knockout ($\phi 21$).
- ③ The AC input power source should be wired through a dedicated opening and be separated from other wirings.
- ④ After completion of wiring, make sure to measure the grounding resistance before connecting cables to each device (10 M Ω or more, using a 250 V insulating resistance tester).



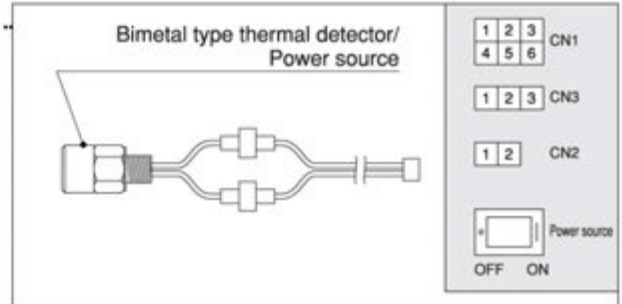
3. Connection of Control Panel

(1) Location of connectors

The control panel has the following four separate connectors:

- ① AC input power source and power failure remote alarming connector (CN1)
- ② Detector (remote control box), connecting connector (CN2)
- ③ Equipment stop signal transfer connector (CN3)
- ④ Starter (gas generator) connector

※The above ①~③ are located in the indication operation section, while the ④ in the control section.



(2) Connection of standard devices

① Connection of bimetal type thermal detector

- One bimetal type thermal detector is supplied, which should be connected to the detector connecting connector (CN2).
- Remove the termination resistor (10kΩ) attached to the detector connecting connector (CN2), before connecting cables to the bimetal type thermal detector.

② Connection of AC input power

- Perform connection of AC 200 V input power.

③ Connection of signal transfers

Type of signal transfer	Connector	Contact capacity	Description
Power failure (CN1)	4 FB3○	DC30V 10A AC250V 5A	Activated in case of power failure or the power source SW turned OFF (indicating the SW OFF condition).
	6 FA3○ 5 FC3○		
Equipment stop (CN3)	1 FA1○	DC30V 2.5A AC250V 1.5A	Activated when the detector or sensor is activated, or when the MANUAL START button is pressed.
	3 FB1○ 2 FC1○		

④ Connection of starter

- Refer to "7. Testing and Setting" for connecting the starter.
- The starter (gas generator) should be connected to the connector for the starter after completion of actuation check.

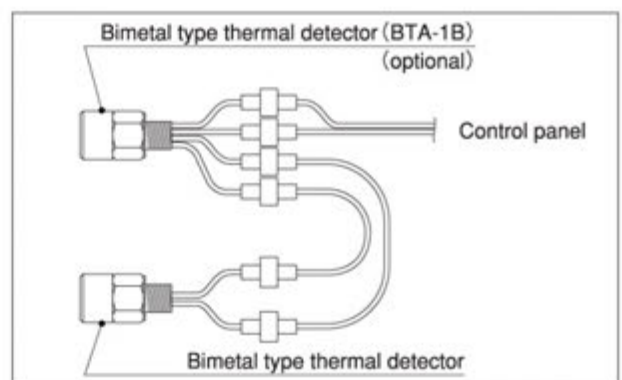
(Note)

The connector for the starter is provided with a dummy connector, which should not be removed until connection for the starter is made. If removed before connection, the POWER lamp will blink and the alarming buzzer will intermittently sound. Since the dummy connector is required at the time of inspection, it should be stored.

(3) Connection of optional devices

① When installing and using two bimetal type thermal detectors

- Connect the bimetal type thermal detector (optional) to the detector connecting connector.
- The bimetal type thermal detector attached is provided with a built-in termination resistor, which should be connected without fail to the terminal point.

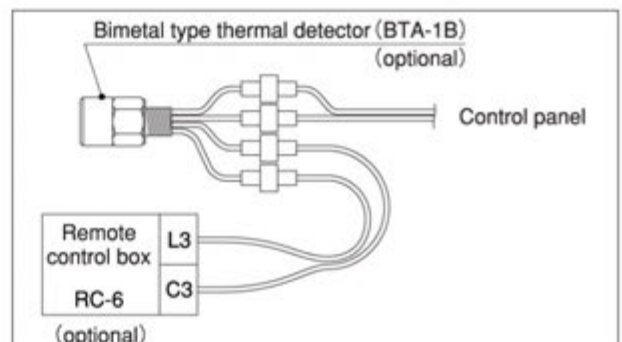


② Connection of remote control box

- Connect the remote control box (RC-6, optional) to the bimetal type thermal detector (optional).

(Note)

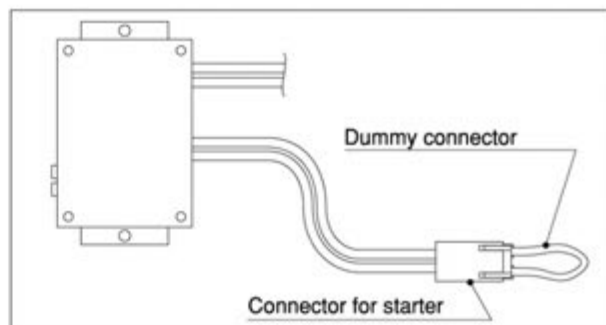
The remote control box (RC-6) has a built-in termination resistor (10kΩ). When connecting two or more pieces, one piece should have a built-in termination resistor, while the other(s) should have no such termination resistor.



7. Testing and Setting

1. Test Preparation

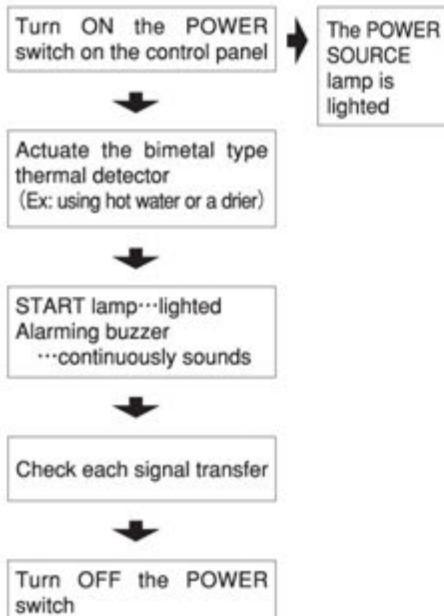
- ① Do not join up the connector for the starter to the connector for the starter of the control panel.
- ② The connector for the starter is provided with a dummy connector, which should not be removed until connection for the starter is made after completion of testing. If removed before connection, the POWER lamp will blink and the alarming buzzer will intermittently sound.



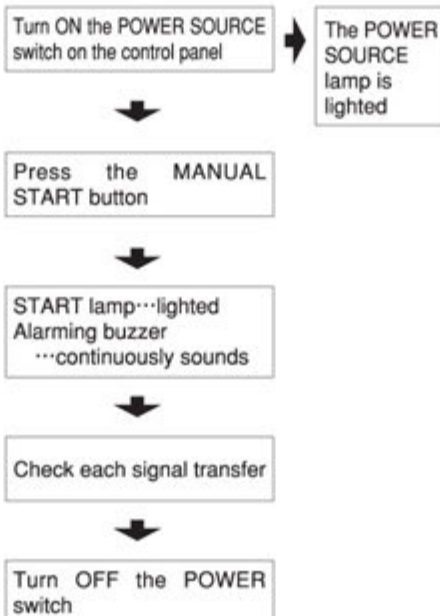
- ③ Ensure that each wiring excepting that for the starter is made to the appropriate connector.

2. Testing

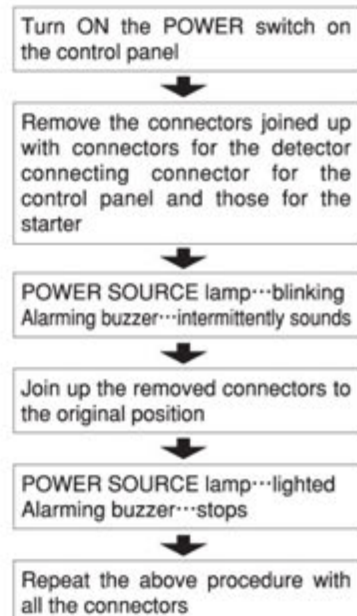
(1) Testing in automatic mode



(2) Testing in Manual Mode

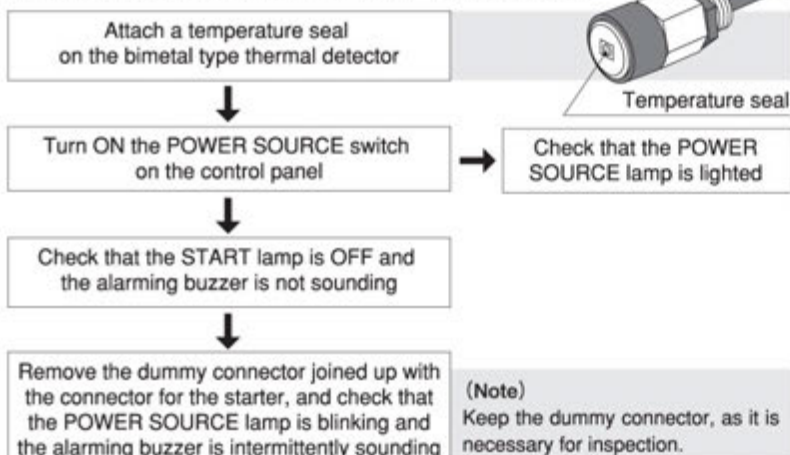


(3) Test of disconnection alarm



3. Setting method

After completion of the above "2. Testing":



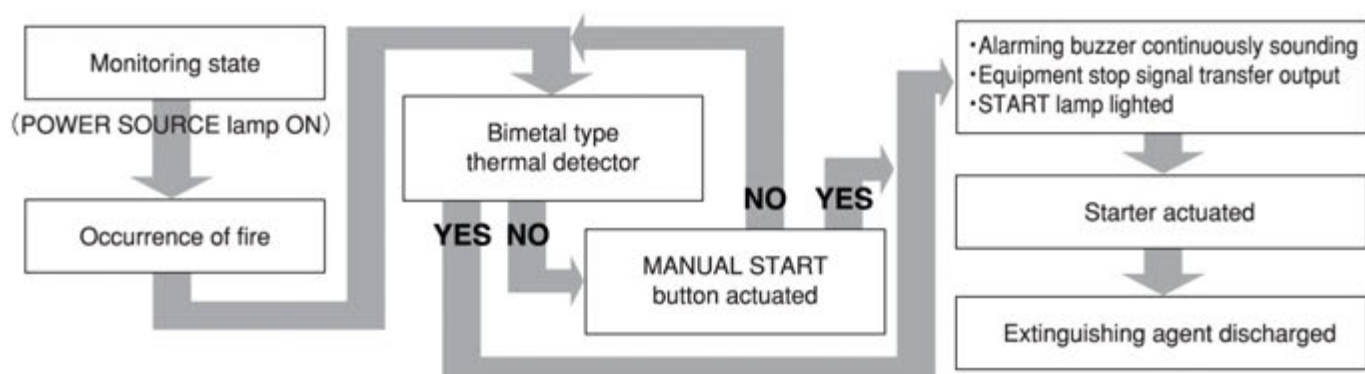
8. Check Sheet

●Checking procedure at the time of installation

(enter ○ or ×)

Check item	Installation contractor	End user
1. Check after execution		
a) Are the installation and fixation of the main body and each device completed?		
b) Is the piping and wiring work completed?		
2. Check before operation test		
a) Is the gas generator not connected to the control panel?		
3. Check at the time of automatic testing operation		
a) Testing in automatic mode		
① Warm the detector using a drier		
② Has the alarming buzzer sounded?		
③ Is the signal transfer output normal? (Is the equipment stop signal transferred?)		
④ Turn "OFF" the power supply and restore the control panel. Is it fully restored?		
4. Check of manual test		
a) Press the MANUAL START button		
① Has the alarming buzzer sounded?		
② Is the signal transfer output normal? (Is the equipment stop signal transferred?)		
③ Turn "OFF" the power supply and restore the control panel. Is it fully restored?		
5. Test and check of remote control box (optional)		
a) Press the MANUAL START button on the remote control box		
① Has the alarming buzzer sounded?		
② Is the signal transfer output normal? (Is the equipment stop signal transferred?)		
③ Turn "OFF" the power supply and restore the control panel. Is it fully restored?		
6. Check at the final delivery		
a) Remove the dummy connector for the starter		
① Has the abnormality alarming buzzer sounded?		
b) Connect the starter connector		
① Has the abnormality alarming buzzer stopped sounding?		
7. Check at the final startup		
a) Is the POWER SOURCE lamp is lighted		
b) Is the abnormality alarming buzzer not sounding?		
Date inspected	• •	• •
Fire extinguisher serial number <div style="border: 1px solid black; height: 40px; width: 350px; margin-top: 5px;"></div>	Customer's signature	

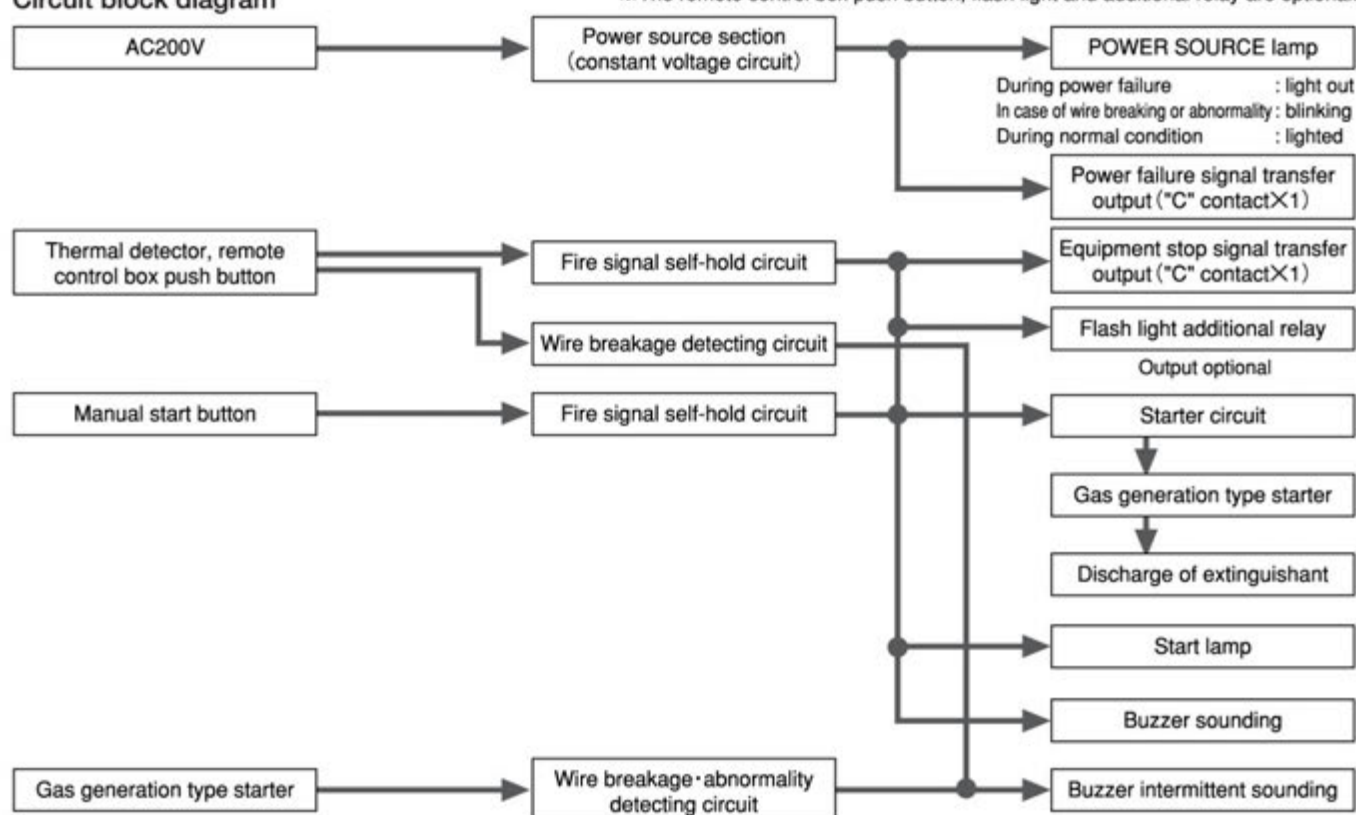
9. Operation Flow Chart



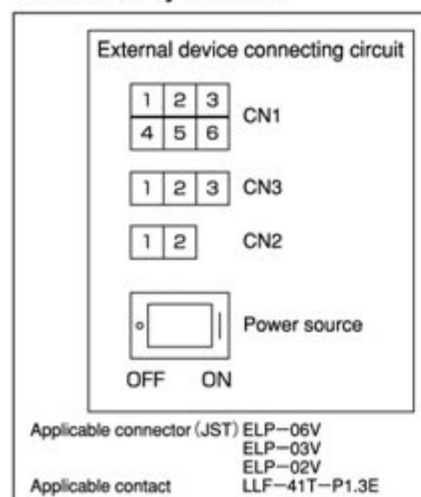
10. Circuit Block Diagram

Circuit block diagram

※The remote control box push button, flash light and additional relay are optional.



Connector symbol list

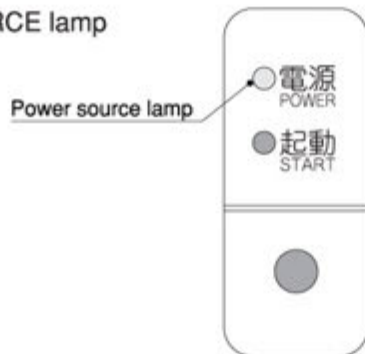


Connector	Number	Application	Description	Remarks
CN1	1	AC input	AC200V±10% 0.1A	
	2			
	3	Earthing	Earthing	DC 30V 10A AC 250V 5A
	4	Power failure signal transfer	FB3	
	5		FC3	
CN3	6		FA3	
	1	Equipment stop signal transfer	FA1	DC 30V 2.5A AC 250V 1.5A
	2		FC1	
	3		FB1	
CN2	1	Connection of detector	Connect to bimetal type thermal detector and remote control box	Connect to termination resistor 10kΩ
	2			

11. Daily Operation

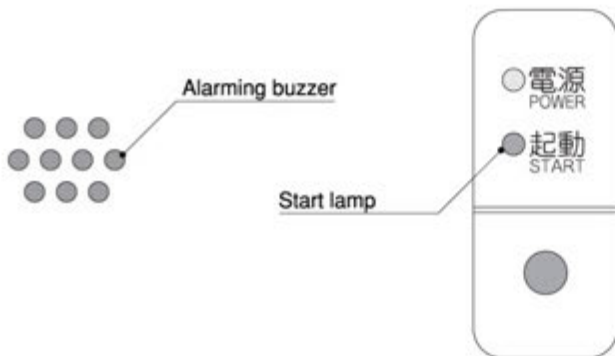
1. Monitoring status

The POWER SOURCE lamp is lighted in green.



3. Operating conditions

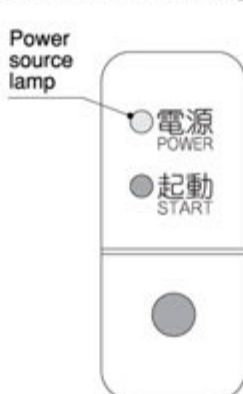
- ① The START lamp is lighted.
- ② The alarming buzzer continuously sounds.



4. Abnormality Conditions

- ① **In case of power failure**
The POWER SOURCE lamp is turns OFF.
- ② **In case of abnormalities such as wire breakage**

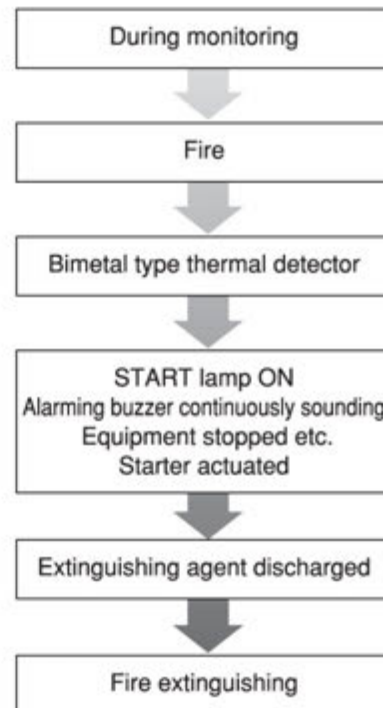
In case of wire breakage of the bimetal type thermal detector, the connector for the starter and the gas generator as well as abnormality in the starter circuit, the POWER SOURCE lamp blinks and the alarming buzzer intermittently sounds.



2. Operation Method

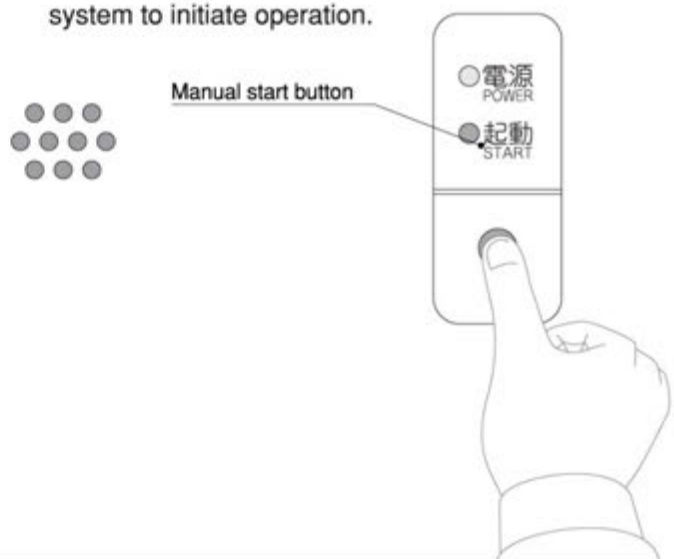
① In case of automatic mode

The entire system is automatically operated, but manual startup is also allowed.



② In case of manual mode

Pressing the MANUAL START button allows the system to initiate operation.



5. Treatment after Operation

- ① Turn OFF the POWER SOURCE switch to restore the system.
- ② After the system has been operated, contact us or our agents to perform necessary treatment of refilling the fire extinguishing agent and replacing the generator.

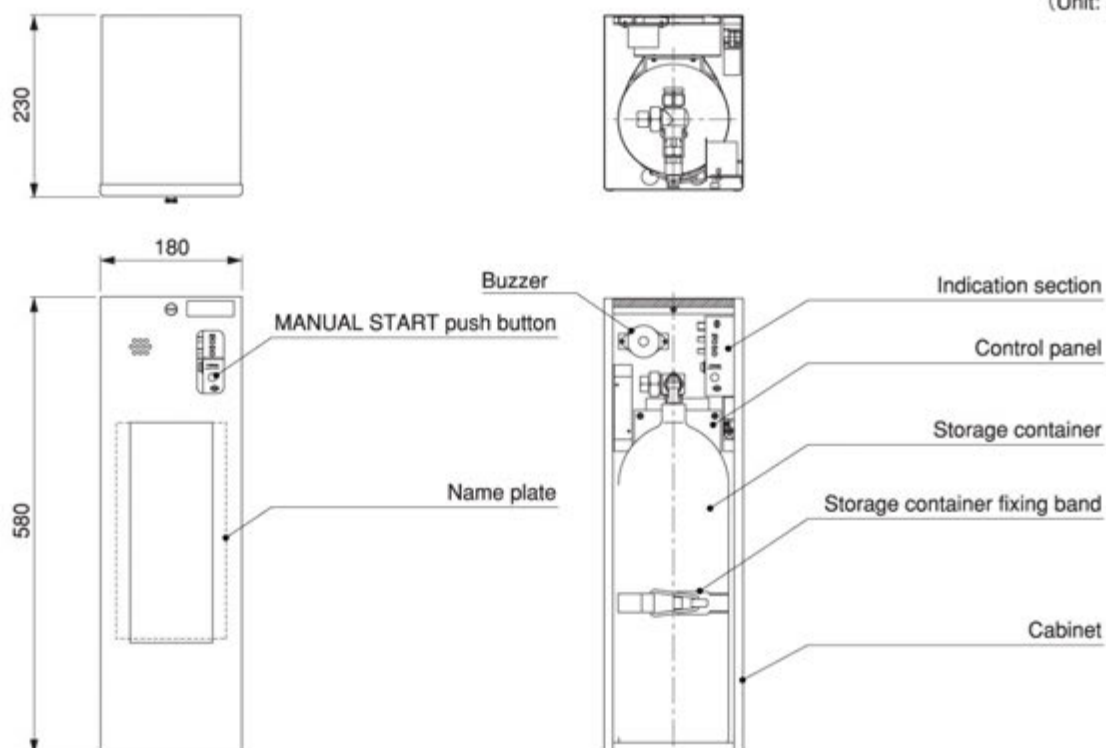
12. Specifications

		Type YAC-3	Type YAC-7
Extinguishing agent		Carbon dioxide	
Amount of extinguishing agent		3.2kg	6.8kg
External dimensions of cabinet (H×W×D)		580mm×180mm×230mm	805mm×210mm×250mm
Coating specification		Melanin baking finish. Coating color: Red (Japan Paint Manufacturers Association's R38-145)	
Total mass		Approx. 17 kg	Approx. 30 kg
Starting method		Starting with a gas generator	
Discharging time		Approx. 11 seconds	Approx. 20 seconds
Connecting pipes		Copper pipe $\phi 8 \times \phi 6$ 5m attached	Copper pipe $\phi 10 \times \phi 8$ 5m attached
Type of connecting pipes		Phosphorus anti-oxidation seamless copper pipe (JIS H 3300)	
Pipe connections		Self-sealing with entrenching rings	
Control panel	Type name	GCA-3L	
	Input power supply	AC200V \pm 10%, 50/60Hz	
	Power consumption	max 20VA	
	Manual start button	Momentary, gold contact, red point	
	Alarm buzzer	Electronic buzzer with an acoustic pressure of 85dB or more	
	POWER indicator lamp	Green lamp ON when fed by AC power, green lamp blinking during abnormality	
	Start lamp	Red lamp ON during startup	
	Sensor input	One circuit (with disconnection detection function)	
	Starting output	Connector connected (for one gas generator)	
	Signal transfer output for equipment stop	DC30V 2.5A AC250V 1.5A ("C" contact) ×1	
	Signal transfer output for power failure	DC30V 10A AC250V 5A ("C" contact) ×1	
	Ambient temperature range	0 to 40°C (no condensation)	
Bimetal heat detector		BTA-1R (service temperature: 70°C)	
Optional	Bimetal heat detector	BTA-1R (service temperature: 70°C)	
	Remote control box	RC-6	
	Equipment stop signal transfer	Enabled by additional relay	

13. Construction Drawing

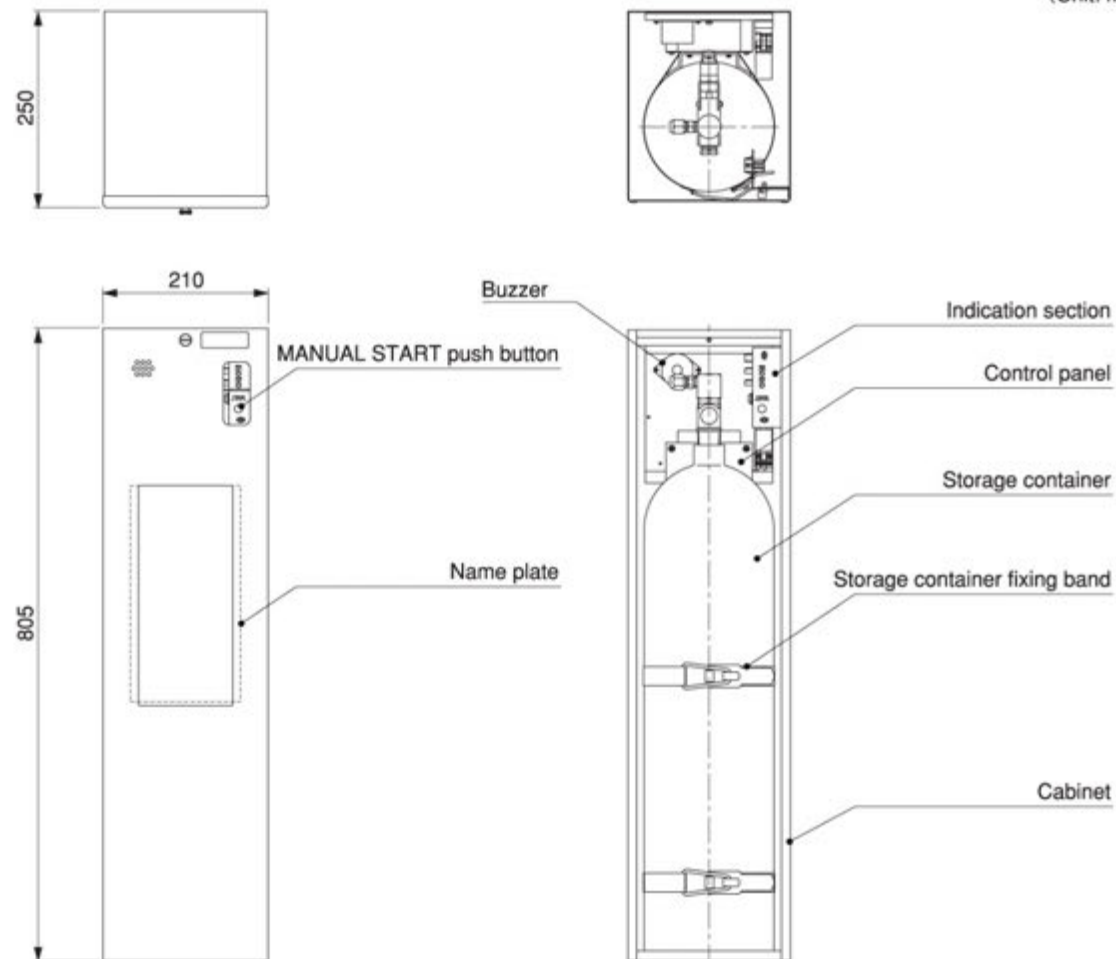
(Type YAC-3)

(Unit: mm)



(Type YAC-7)

(Unit: mm)



YAMATO PROTEC CORPORATION

Building Disaster Prevention Facilities / Plant Disaster Prevention Facilities / Evacuation Alarming Facilities / Various Extinguishers

Tokyo Office	:17-2, Shirokanedai 5-chome, Minato-ku, Tokyo 108-0071 Phone:03-3446-7151(main number) Fax:03-3446-7160
Osaka Branch Office	:1-10, Fukae-kita 2-chome, Higashinari-ku, Osaka-city 537-0001 Phone:06-6976-0701(main number) Fax:06-6976-0802
Nagoya Branch Office	:5-58,Tsujimachi kita-ku, Nagoya-city 462-0032 Phone:052-914-2381 Fax:052-914-2435
Sapporo Branch Office	:1-1, Kita-niyyuunanajo Higashi 19-chome, Higashi-ku, Sapporo-city 065-0027 Phone:011-780-1700 Fax:011-780-1701
Sendai Branch Office	:6-1, 6-cho no menakamachi, Wakabayashi-ku, Sendai-city 984-0012 Phone:022-287-9531 Fax:022-287-9534
Saitama Branch Office	:1-68, Miyaharacho, Kita-ku, Saitama-city 331-0812 Phone:048-652-1345 Fax:048-652-1321
Yokohama Branch Office	:426-1, Imajyukunishimachi, Asahi-ku, Yokohama-city 241-0031 Phone:045-954-4411 Fax:045-954-4422
Shizuoka Branch Office	:231-1, Ikeda, Suruga-ku, Shizuoka-city 422-8005 Phone:054-263-0119 Fax:054-262-7741
Hiroshima Branch Office	:7-4, Mitakicho, Nishi-ku, Hiroshima-city 733-0005 Phone:082-237-4625 Fax:082-239-3859
Shikoku Branch Office	:202, Ohashicho, Matsuyama-city 791-1126 Phone:089-963-5850 Fax:089-963-5877
Fukuoka Branch Office	:7-12, Naka 5-chome, Hakata-ku, Fukuoka-city 812-0893 Phone:092-411-4224 Fax:092-411-4229
Osaka Factory	:2-38, Mokuzai-dori 2-chome, Mihara-ku, Sakai-City, Osaka Pref. 587-0042 Phone:072-361-5911 Fax:072-361-6370
Tokyo Factory	:1951, Nagasao-michimae, Kawachi-machi Inashiki-gun, Ibaragi Pref. 300-1312 Phone:0297-84-4451 Fax:0297-84-4716
Center for Research & Development	:1951, Nagasao-michimae, Kawachi-machi Inashiki-gun, Ibaragi Pref. 300-1312 Phone:0297-84-4711 Fax:0297-84-4712
Kanto Transportation Center	:6-35, Okada 3-chome, Atsugi-city, Kanagawa Pref , 243-0021 Phone:046-226-8161 Fax:046-228-7880
Recycle Center	:2-38, Mokuzai-dori 2-chome, Mihara-ku, Sakai-City, Osaka Pref. 587-0042 Phone:072-361-7518 Fax:072-361-7519

●For further information about this product

Ask the dealer where you bought the fire extinguisher or call YAMATO PROTEC's number.

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