



# Series Internal Detector



Ultra-Small, ultra-high-sensitive  
smoke/heat detector

It is also very important to take measures  
to protect equipment from fire



**Ultra-Small detector is 1/10 the size  
of conventional detectors, and  
50 times more sensitive (0.1%/m).**

**F Series detectors are the smallest available on the  
global market. With Ultra-Small size and variation  
of sensitivities, F Series detectors support a wide  
variety of requirements.**



FENWAL CONTROLS OF JAPAN, LTD.

# Smallest smoke detectors available on the global market are able to detect fire inside equipment at the initial stage.

## Features of the F Series that minimize latent risk of fire inside high-density equipment

In the event of equipment fire, the equipment would first of all be damaged. It would also result in financial loss due to work stoppage and would also significantly damage corporate image.

The F Series of super-compact smoke detectors protect important equipment (or systems) from fire.

By making detectors more compact than ever, they can now be mounted into tight spaces to detect fires in the initial stage by detecting abnormalities inside the equipment, thereby enabling fires to be prevented before they occur.

### 1. Ultra-Small

With a mere  $\Phi$  28mm x 57mm contour, F Series detectors are the smallest available anywhere in the world.

# 1/10

Size comparison

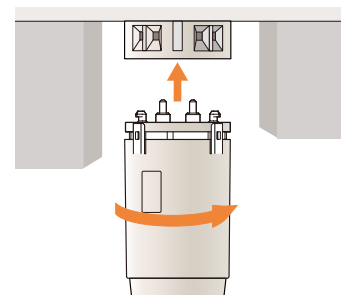
# 1/16

Mounting space requirement comparison

Employs a system that allows detectors to be mounted in tight places by simply inserting and turning. Enables mounting in places with little clearance (requires only 1/16 the mounting space, is 1/10 the size and 1/5 the weight of our traditional model).



Ten times more compact than the traditional model and yet offers high sensitivity.



To mount, just insert in the mounting base and turn.



Enables detectors to be easily mounted in tight places that used to be impossible, such as server racks and power supply equipment.

From ultra-high sensitivity of 0.1%/m used in clean rooms, to 10%/m used in ordinary atmosphere, the F Series supports a wide variety of requirements such as application, specifications, environment, output and control system.

## 2. Ultra-high sensitivity

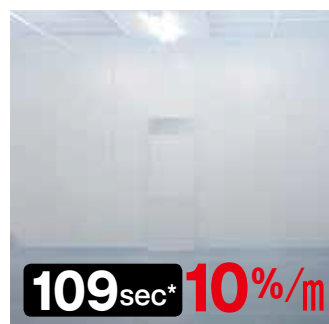
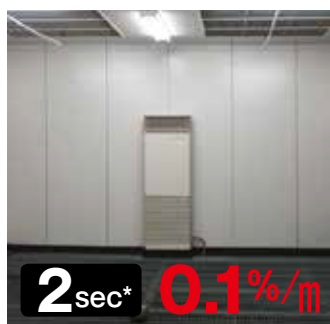
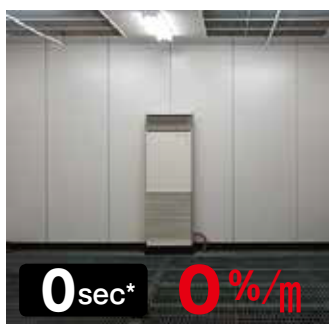
Ultra-high sensitivity of 0.1%/m is 50 times more sensitive than conventional detectors.

# 50times

Comparison with conventional detectors

Electrical fires involving cables, etc., inside electrical devices begin with cables, etc., becoming soft due to heat caused by poor connection, etc. The softened cables then begin to produce smoke and subsequently catch fire. Conventional smoke detectors work by sensing this emission of smoke.

Because our newly developed detectors are ultra-sensitive, they are able to detect transparent vapor emitted by plasticizers, etc., when the cable becomes soft prior to producing smoke, thus enabling fire to be prevented before it occurs.



Transition of smoke density (attenuation rate %/m) of smoke emission specimen (results of experiment conducted by Fenwal Controls)

\*Subsequent to smoke emission

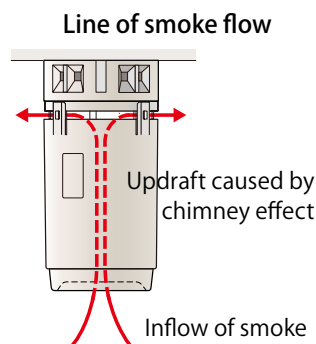
## 3. Inflow property of smoke

Vertical construction enables quicker detection of smoke inflow.

# Vertical Flow

Line of smoke flow

The line of smoke flow for conventional smoke detectors is parallel to the ceiling. Our newly developed smoke detector, however, is the first in the industry that employs vertical construction which matches the line of smoke flow. Vertical construction promotes the "chimney effect" of airflow caused by heat emitted from electronic components. It therefore enables smoke produced by abnormal conditions to enter the smoke detector faster and more reliably.



## 4. Address function

You can set a unique address for each detector connected to the control unit. This enables you to identify the location where smoke was detected in an instant.

## 5. Operation and user-friendliness



Connecting the control unit to a PC enables you to easily change detector addresses and sensitivity settings, or check current state, log, etc. Sensors and control unit can be mounted on a DIN rail.

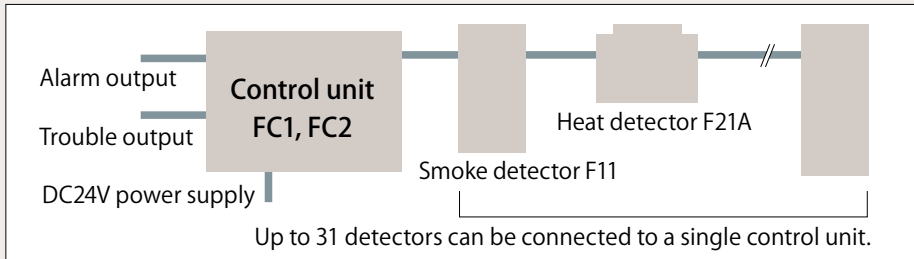


# The F Series supports environmental requirements.

## Variation 1

You can combine smoke and heat detectors.

You can build a system containing both smoke and heat detectors by connecting them to the control unit.



## Variation 2

Can be connected to a PC

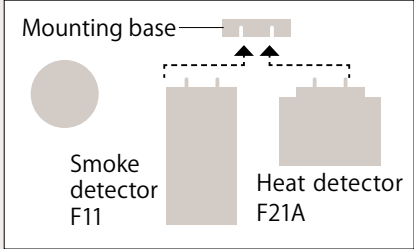
If you connect the control unit to a PC, you can reset or change settings, or check current state, log, etc., remotely on the PC.



## Variation 3

Same mounting base used for all detectors

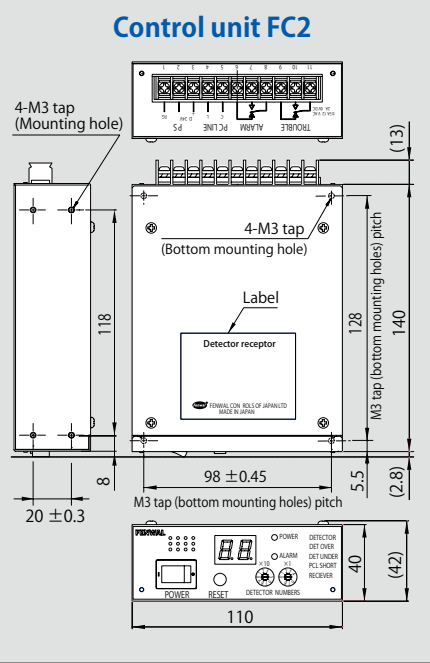
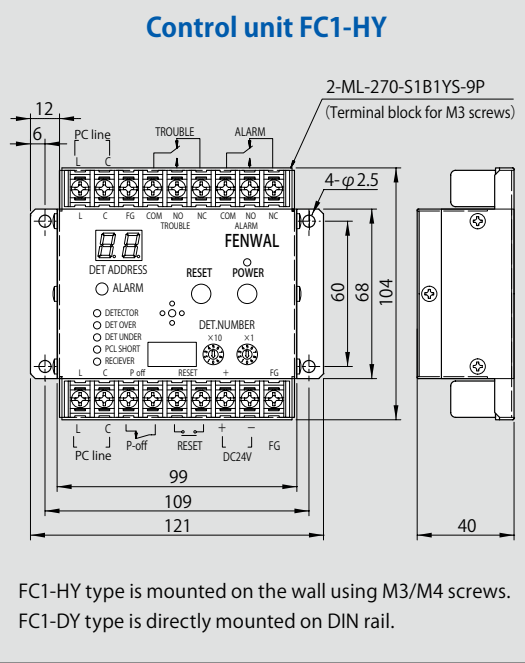
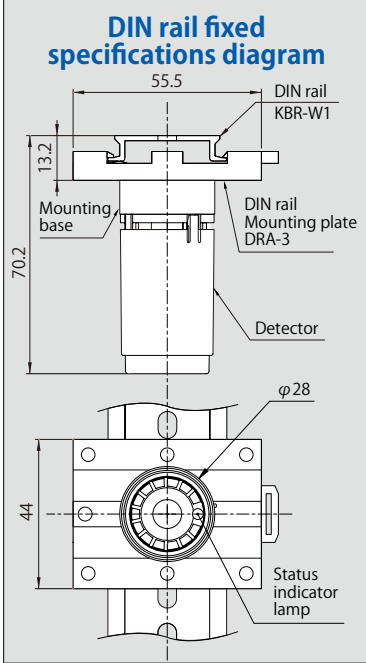
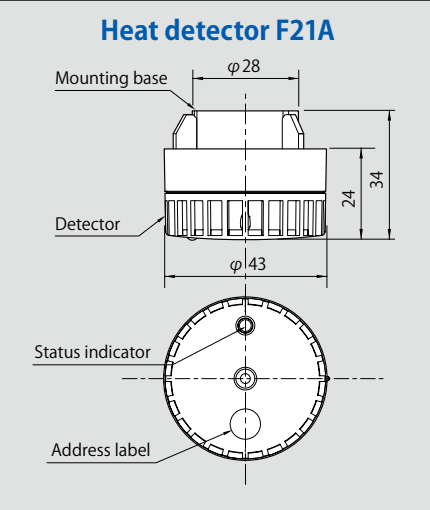
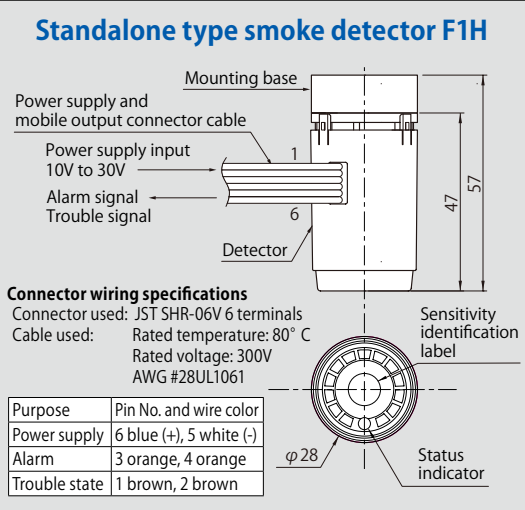
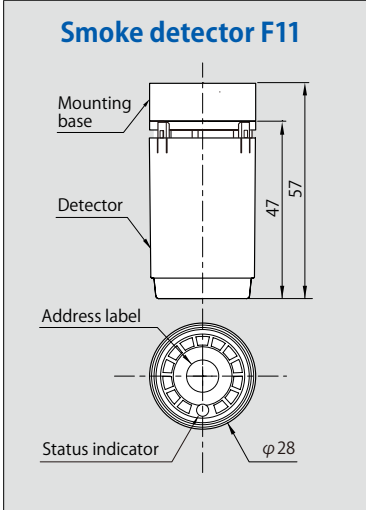
Smoke and heat detectors use the same mounting base, so you can recombine them for monitoring.



## Variation 4

Your choice of 2-way control unit mounting method

The F Series offers your choice of control unit that can be directly mounted on a DIN rail or type that is mounted on a panel.





# Our amazing smoke detector for equipment fires.

## F Series offers selection

Supports all sorts of requirements including application, specifications, environment, and installation conditions.

### Selectable Sensitivity







Supports from 0.1%/m to 10%/m according to specified environment ranging from ordinary atmosphere to ultra-clean rooms.

### Selectable Output

Supports applications such as ON/OFF contact output and PC output.

### Selectable System

You can select a system that connects to a receiver or standalone type that offers direct output from detectors.

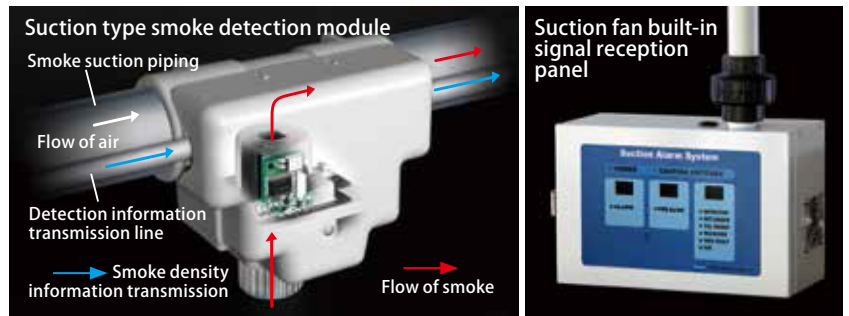
Type	Model No.	Appearance	Sensitivity	Output	Specifications
Smoke detector	F11-Y1-XX <sup>*1</sup> (XX: address)		Standard setting: 5%/m <sup>9</sup> Setting range: 3 ~ 10%/m <sup>5</sup> Setting unit: 0.5%/m	Output via control unit	Rated voltage: DC24V 0.5mA (Y1), 1mA (Y05,Y01) Operating voltage range: DC16V ~ DC30V (F11-Y01 only DC20.4 ~ DC26.4V)  Current consumption: Monitoring state: 0.35mA (Y1), 0.8mA (Y05,Y01) Alarm state: 0.45mA (Y1), 0.9mA (Y05,Y01) Status indicator: Red LED Monitoring state: Blinks per 10 sec. Alarm state: Blinks per 2 sec. Trouble state: Off Restoration: Automatic restoration Address: Address recorded for each detector (effective addresses 01 ~ 31) Weight: Approx. 20g (30g including mounting base) Color: White Operating temperature range: 0° C ~ 50° C (Y1), -10 ~ 50° C (Y05, Y01) Storage temperature range: -20° C ~ 70° C Operating humidity range: 30~85%RH (no condensation)
	F11-Y05-XX <sup>*2</sup> (XX: Address)		Standard setting: 5%/m <sup>9</sup> Setting range: 0.5 ~ 5%/m <sup>5</sup> Setting unit: 0.5%/m		
	F11-Y01-XX <sup>*2</sup> (XX: Address)		Standard setting: 0.1%/m <sup>9</sup> Setting range: 0.1 ~ 0.5%/m <sup>5</sup> Setting unit: 0.05%/m		
Heat detector	F21A-Y1-XX (XX: Address)		70° C <sup>*3</sup>	Output via control unit	Rated voltage: DC 24V 1mA Weight: Approx. 26g (including mounting base) Alarm setting value: 70° C Rate compensation State indicator and humidity range same as F11-Y1
Smoke detector (standalone type)	F1H-RYW1 -05BB2 <sup>*7</sup>		Standard setting: 5%/m Setting range: 3 ~ 10%/m <sup>5</sup> Setting unit: 1%/m	Both contacts are open if power is shut off.	Rated current: 30mA Operating voltage range: DC10V ~ 30V Status indicator: Red LED Monitoring state: Blinks per 10 sec. Alarm state: Blinks per 1 sec. Trouble state: Off Restoration: Automatic restoration Weight: Approx. 15g (25g including mounting base) Color: White Operating temperature range: -10° C ~ 60° C Storage temperature range: -20° C ~ 75° C Operating humidity range: 30~85%RH (no condensation)
	F1H-RYW1K -R5BB2 <sup>*7</sup>		Standard setting: 0.5%/m Setting range: 0.5 ~ 5%/m <sup>5</sup> Setting unit: 0.5%/m, 1%/m <sup>6</sup>		
	F1H-RYW1K2 -R1BB2 <sup>*7</sup>		Standard setting: 0.1%/m Setting range: 0.1 ~ 0.5%/m <sup>5</sup> Setting unit: 0.1%/m		
Heat detector (standalone type)	F2H-RYW -70BB		70° C <sup>*3</sup>	It takes approx. 1 second for contact to return to normal monitoring state after power is turned on. Contact A or B can be selected.	Alarm setting value: 70° C Rate compensation Weight: Approx. 20g (30g including mounting base) Status indicator: Red LED Monitoring state: Blinks per 10 sec. Alarm state: Blinks per 2 sec. Trouble state: Off Operating temperature range: 0° C ~ 50° C Other specifications are same as F1H Series
Control unit	FC1-DY <sup>*1,8</sup> FC1-HY <sup>*1,8</sup>		Smoke Standard setting: 5%/m Setting range: 0.5 ~ 15%/m <sup>5</sup> Setting unit: 0.5%/m	It takes a maximum of 2 minutes for contact to return to normal monitoring state after power is turned on.	Rated voltage/current: DC24V, 0.5A Operating voltage range: DC24V ± 10% Max. No. of detectors that can be connected: 31 External wiring resistance: Max. 10 Ω (between control unit and detector) Alarm: Electronic buzzer Alarm Continuous ringing During trouble Intermittent ringing Weight: Approx. 420g Operating temperature range: 0° C ~ 60° C Storage temperature range: -20° C ~ 70° C Operating humidity range: 30~85%RH (no condensation)
	Heat		Standard setting: 70° C		
	Smoke		Standard setting: 0.1%/m Setting range: 0.05 ~ 5.00%/m <sup>5</sup> Setting unit: 0.05%/m		
	Heat		Standard setting: 70° C		
FC2 <sup>*1,8</sup>		Smoke	Standard setting: 5%/m Setting range: 0.5 ~ 15%/m <sup>5</sup> Setting unit: 0.5%/m	It takes a maximum of 1 minute for contact to return to normal monitoring state after power is turned on.	Rated voltage/current: DC24V, 0.5A Weight: Approx. 450g External wiring resistance: Max. 13 Ω Other specifications are same as FC1 Series
		Heat	Standard setting: 70° C		

\*1) F11-Y1-XX and F11-Y05-XX detectors can be connected to control unit FC1-DY, FC1-HY or FC2. \*2) F11-Y01-XX detectors can be connected to control unit FC1H-DY or FC1H-HY. \*3) Option: Alarm setting value can be set within the range of 10 to 90° C; please contact us in advance. \*4) Option: Dedicated cable and software are required. \*5) Set at factory. Model numbers other than standard settings are set by 2-digit numbers. Examples) 3%/m: 03, 1%/m: 01, 10%/m: 10, 0.3%/m: R3. \*6) Set in 1%/m units if over 1%. \*7) 1st and 2nd digit of last 5 digits for F1H. Example) 1%/m F1H-RYW1K-01BB2 \*8) Last 2 digits for FC1. Example) 3%/m FC1-DY-03. \*9) Depending on the standard setting for the connected control unit.

Product developed by Fenwal Controls of Japan, which has a proven track record in fire prevention systems for industrial applications such as large-scale facilities and plants.



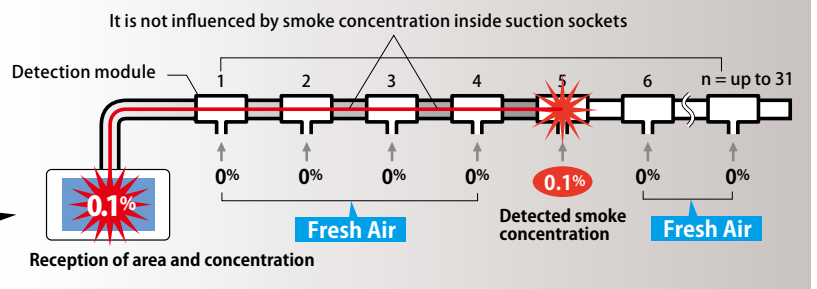
## High sensitivity suction type smoke detector system



**Able to detect smoke in areas that were blind spots for conventional suction type smoke detector systems.**

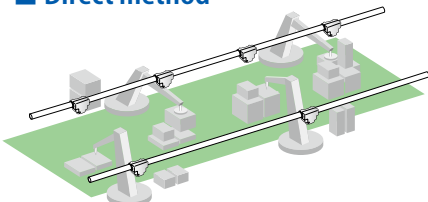
- ① Smoke area unspecifiable due to collective aspiration from suction tube.
- ② True detection impossible due to smoke dilution in suction tube.
- ③ Slow detection if suction area and control unit are distant.

**Best Solution**



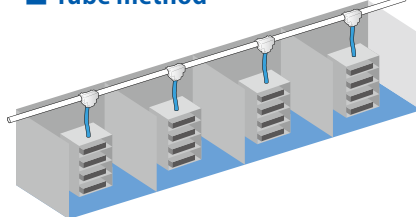
**Installation example** Origin of smoke can be identified quickly by high-sensitivity detection module with set address.

### Direct method



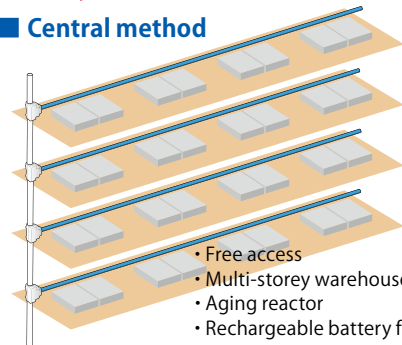
- Semiconductor test equipment / FA line
- Communication equipment room / wireless relay station
- Food manufacturing line, etc.

### Tube method



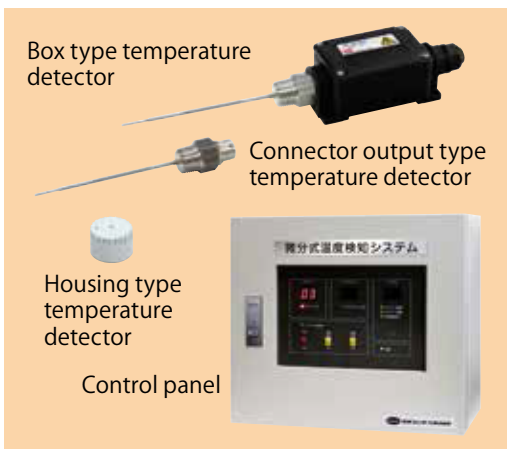
- Distribution board / server
- Power supply unit, etc.

### Central method



- Free access
- Multi-storey warehouse, rack
- Aging reactor
- Rechargeable battery factory, etc.

## Differential type Duct fire detection system and fire extinguishing system contained inside duct



**Quickly detects hard-to-detect duct fires and extinguishes them instantaneously.**



Heat produced by duct fires is diluted by large amounts of exhaust, and could not be detected by conventional temperature detectors. Differential temperature detection systems detect variation in temperature produced by fluctuation of fire or flames rather than temperature itself. Combining with our duct fire extinguishing system that instantaneously distinguishes duct fires, realizes a system that instantaneously detects and extinguishes duct fires.

**Fenwal** FENWAL CONTROLS OF JAPAN, LTD.

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