

AQ8920

Fiber Optic Distributed Temperature Unit



* PC controller not included.

<Features>

- Uses optical fiber as temperature sensor
- Uses laser to measure temperature distribution over distances as long as 2 km
- Ideal for applications such as monitoring for fires in buildings

Fiber Optic Distributed Temperature Unit AQ8920

Measure Temperature Distribution Using a Laser

The AQ8920 optical fiber distributive temperature measurement instrument uses optical time domain reflectometer (OTDR) technology. When an optical fiber is connected and light pulses are input, the AQ8920 detects the rear scattered light (Raman scattered light) and converts it to a temperature distribution. Because the temperature sensor consists of optical fiber, it is highly resistant to explosion.

Features

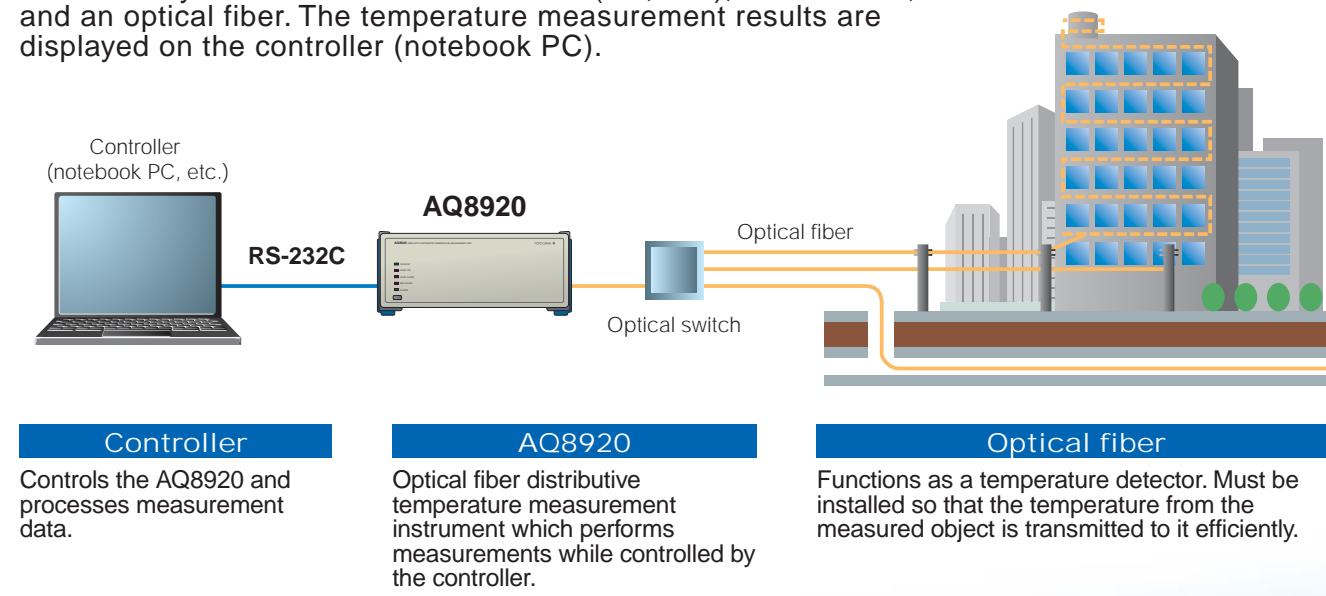
- Continuously measures temperature distribution over distances as long as 2 km with a sampling resolution of 50 cm
- Measures temperature distribution over distances as long as 1 km with a precision of $\pm 1^\circ\text{C}$ per 10 seconds
- Instrument control through RS-232C interface
- Temperature measurement sample software included
(compatible with Windows® 2000/XP)

Applications

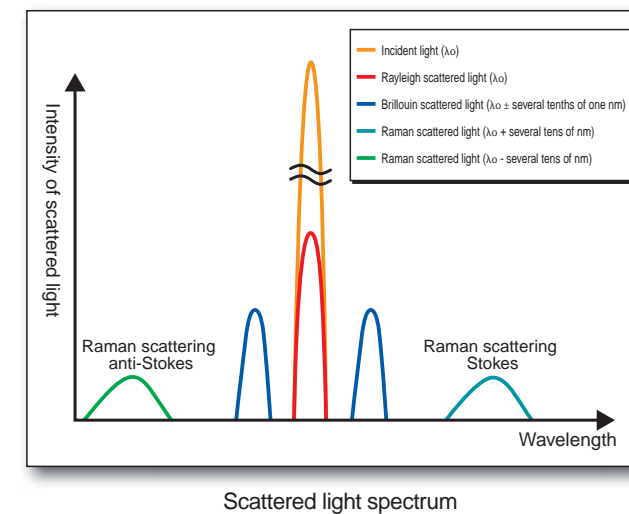
- Temperature management for plant facilities
- Research and studies related to disaster prevention
- Air conditioning facilities in power stations and large-scale buildings

Example System Configuration

The basic system consists of a controller (PC, etc.), the AQ8920, and an optical fiber. The temperature measurement results are displayed on the controller (notebook PC).



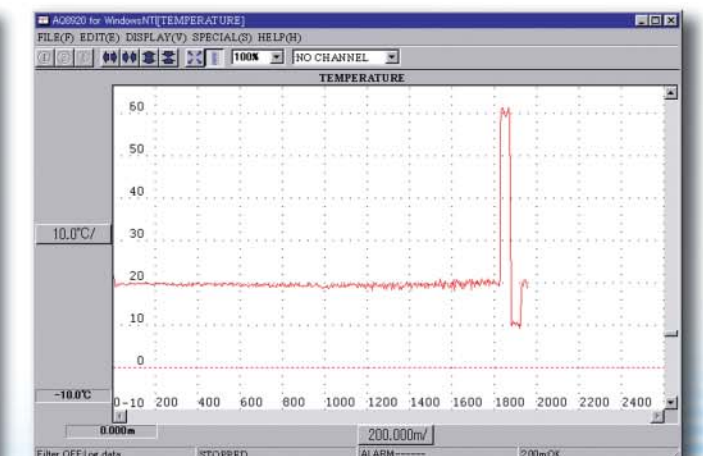
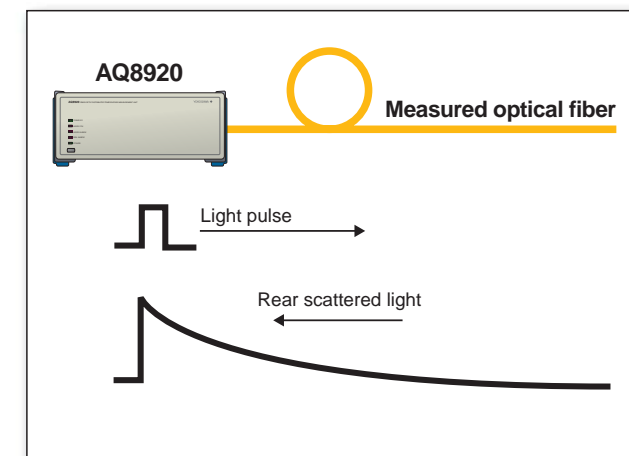
Principles of Measurement Operation



There are various types of rear scattered light, including Rayleigh scattered light, Raman scattered light, and Brillouin scattered light. The AQ8920 uses Raman scattered light, which has the highest temperature dependence among these various light types. The temperature is measured and the scattered light is separated and received. Raman scattered light consists of anti-Stokes light, which occurs at the shorter wavelength end (relative to the wavelength of the light pulse), as well as Stokes light, which occurs at the longer wavelength end. The intensity ratio of these two components changes in proportion to changes in temperature. This characteristic can be used to measure temperature using optical fiber.

Light pulses are input to the measured optical fiber to measure the temperature distribution. The measured optical fiber is a 50/125 μm GI quartz multimode optical fiber.

It may be necessary to study the sheathing's heat withstanding ability and other factors, depending on the temperature environment where the optical fiber is installed, and environmental conditions such as whether the sheathing would be melted by the heat.



Specifications

Approved fiber	GI (50/125 μm)
Maximum measurement distances	1 km, 2 km
Displayable temperature range (*1)	-200°C to +300°C
Temperature precision (*2) / Measurement time	±1°C per 10 seconds for 1 km maximum distance (with 2 m sampling resolution)
	±2°C per 30 seconds for 2 km maximum distance (with 2 m sampling resolution)
Response distance (*3)	Approximately 4 m
Control method	RS-232C
Power supply	100/200 V AC, 50/60 Hz, 60 VA or less
Laser product safety standard (*4)	IEC60825-1 (2001), Class 1
Environmental conditions	Operating temperature range: 5–35°C
	Humidity: 85% RH or less (no condensation)
Size and weight	Approximately 445 (W) x 205 (H) x 400 (D) mm Approximately 11 kg

Note: The values presented in the above specifications are typical values.

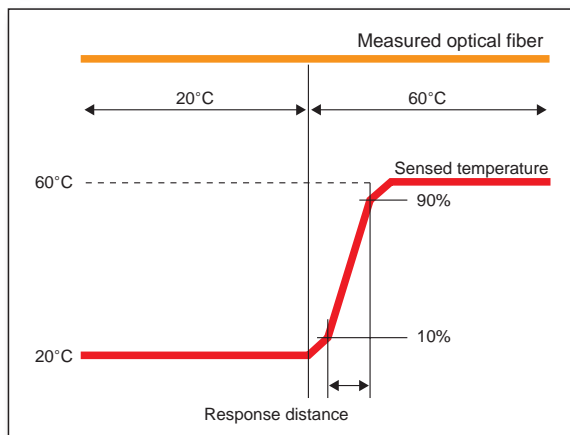
*1: Depends on the optical fiber.

*2: The temperature precision figures are for cases where the operating temperature range is 25±5°C.

*3: The response distance is the distance required for a temperature change of 10–90% at the temperature change point.

*4: Laser product safety standard label

**CLASS 1
LASER PRODUCT**



Optical fiber distributive temperature sensors receive rear scattered light from light pulses, so they have a temperature sensing dead band. This sensing dead band is called the response distance.

Product	Model Number	Specification
AQ8920	813919600	Fiber Optic Distributed Temperature Unit

Main Standards for Approved Fiber

IEC 793-2 A1a

JIS C 6832 SGI-50/125

ITU-T G.651

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