Hot Aerosol Fire Suppression Device

Specification model: GQRR0.01G-0.05G

1 summary

The GQRR0.01G-0.05G is an innovative thermal aerosol fire suppression system, representing a groundbreaking product in the firefighting field with exceptional efficacy and reliability. This device features a compact design, pressure-free storage, no need for pipeline installation or maintenance, rapid and efficient fire suppression, non-toxic and harmless properties, as well as high safety and environmental sustainability. It is particularly suitable for use in confined environments such as small battery cabinets and narrow spaces.

2 Fire Extinguishing Mechanism

The fire-suppressing effect of S-type thermal aerosols is primarily manifested in the following aspects:

The primary fire-extinguishing mechanisms of conventional extinguishing agents include isolation, asphyxiation, cooling, and chemical inhibition, with each agent employing distinct mechanisms. The fire-extinguishing mechanism of thermal aerosols manifests in two main aspects: the cooling effect from endothermic decomposition, and the synergistic chemical inhibition effects between the gas-phase and solid-phase components. Additionally, the gaseous components within the aerosol extinguishing agent play an auxiliary role in the process.

（1） The cooling and fire-extinguishing effect of endothermic decomposition

The cooling effect of thermal aerosol fire extinguishing agents primarily relies on the endothermic decomposition of metal oxides and carbonates. The heat released by any fire within a short period is limited; if the solid particles in the aerosol can absorb a portion of the heat emitted by the fire source within a short time, the flame temperature will decrease, reducing the radiation to the burning surface and the energy required for combustion.

The heat released during the cleavage of combustible molecules into free radicals after vaporization decreases, thereby partially inhibiting the combustion reaction.

（2） Gas-phase chemical inhibition effect

Under thermal influence, the vaporized metal ions (e.g., Sr, K, Mg) or electron-deficient cations generated from thermal aerosol fire extinguishing agents exist in vapor form. These ions undergo multiple chain reactions with reactive species such as H•, •OH, and O• during combustion. Taking Sr as an example:

$$Sr+2{\bullet}OH \rightarrow Sr(OH)_2 \quad Sr+O{\bullet} \rightarrow SrO \quad Sr(OH)_2+2H{\bullet} \rightarrow Sr+2H_2O$$

Through this repeated process, the active groups in the combustion are significantly depleted, leading to a continuous decrease in their concentration and ultimately suppressing the combustion.

（3） Solid-phase chemical inhibition effect

The solid particles in thermal aerosol fire extinguishing agents can adsorb chain reaction intermediates such as •OH, H•, and O•, catalyzing their recombination into stable molecules

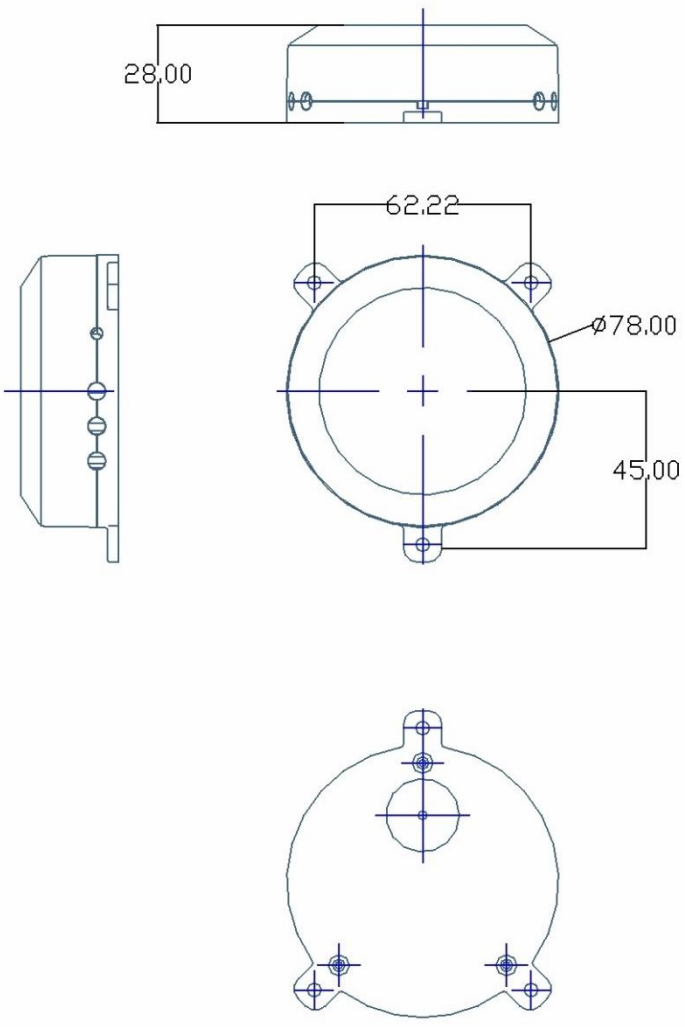
and thereby interrupting the branching chain reactions during combustion. Taking potassium as an example: $K_2O(s) + 2H_2(g) \rightarrow 2KOH(s)$; $KOH(s) + OH(g) \rightarrow KO(s) + H_2O(g)$; $K_2O(s) + O(g) \rightarrow 2KO(s)$; $KO(s) + H_2(g) \rightarrow KOH$.

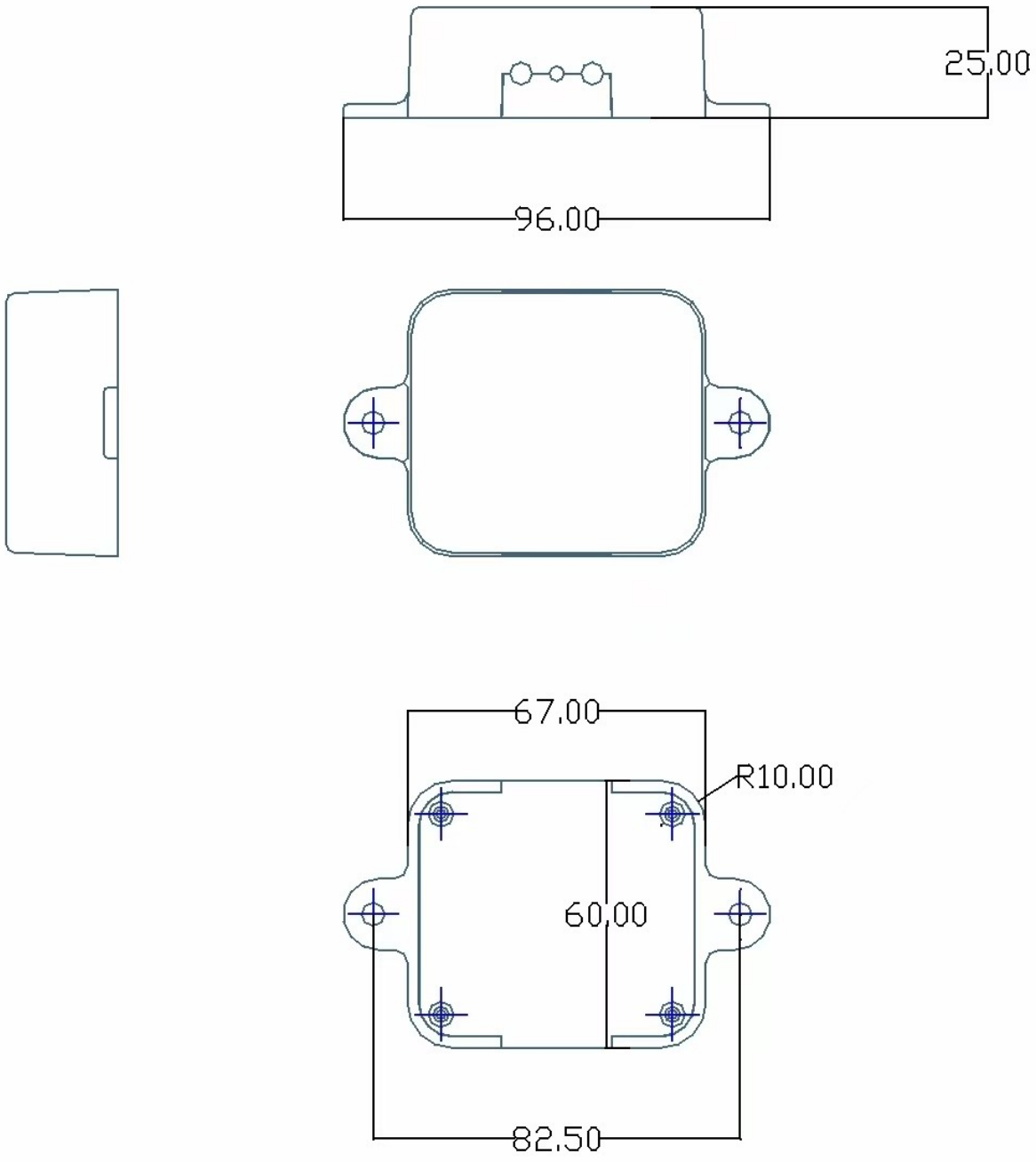
In the aforementioned fire-extinguishing mechanism, several extinguishing principles interact and work synergistically. However, the gas transport effect and the endothermic cooling effect of metal oxides or carbonates serve only as auxiliary roles; the primary fire-extinguishing efficacy relies predominantly on..Chemical inhibition effects on gas and solid phases.

3 Technical Parameter

Project	Parameter	Project	Parameter
Ts	GQRR0.01G-0.05G	Starting mode	Hot start/and/or electric start
Work environment temperature range	-50℃~+90℃	Hot startup temperature	≥170℃
Relative humidity of the working environment	≤95%RH	Specification and dimension	Φ78*32
Emission time	≤5s	Effective protection space	100g/m³
Emission lag time	≤1s	Term of validity	10 years
Name and Content of the Oxidizing Agent	Strontium nitrate, potassium nitrate 50%-58%		

4.StructureInstallation




25,00
96,00
67,00
R10,00
60,00
82,50

5 Usage and Operating Precautions

1) It is strictly prohibited to pile equipment, debris, or other obstacles within 0.2 meters directly in front of the fire suppression system nozzle to ensure its effective firefighting performance.

2) After the device is activated, please contact our company promptly for replacement.

3) The device has a validity period of 10 years. After the expiration date, the user unit should contact the supplier.

6、 Security Alert

1) Non-professionals should not disassemble it without authorization.

2) Do not touch the device after spraying or before the housing cools to avoid burns

7、 After-Sale Service

Our company will provide three-warranty services and corresponding technical support for our products in accordance with national regulations governing fire protection products.