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**AMFE AUTOMATIC  
MINIATURE FIRE EXTINGUISHER**





**3M™ NOVEC™**

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# BUILT IN SAFETY

Fire Suppression AMFE (Automatic Miniature Fire Extinguisher) reliably protects devices and equipment in industry, household and consumer electronics such as cabinets, home appliances, televisions, etc. against the dangers of fires. The AMFE detects and extinguishes a fire inside devices, preventing the spread of a fire.



AMFE & CO<sub>2</sub> cylinder



AMFE & 3M™ NOVEC™ cylinder

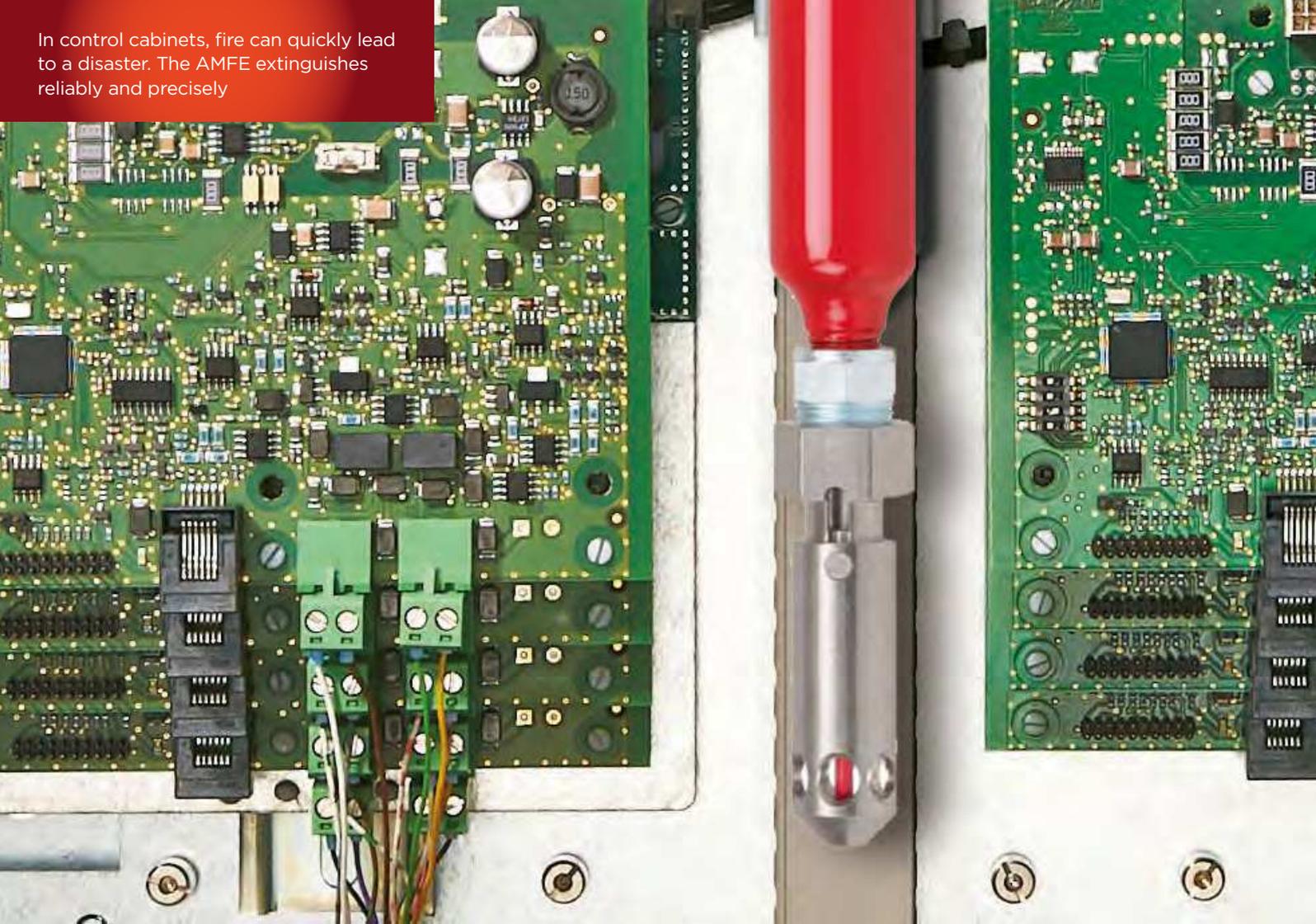


S/R-AMFE & 3M™ NOVEC™ cylinder (with electric signal connections)

## ADVANTAGES AT A GLANCE

- Easy to use
- Maintenance-free
- Easy to install (retrofitable)
- Variety of customer specific operating & releasing temperatures available
- No water being used (gas)
- Scalable
- Robust and shock tolerant
- 3M™ NOVEC™ or CO<sub>2</sub> as extinguishing agent
- Usable in various applications (home, industry, automotive, etc.)
- Mechanical release; no electric power supply required
- Release mechanism: qualified in the automotive and sprinkler industry

In control cabinets, fire can quickly lead to a disaster. The AMFE extinguishes reliably and precisely



## ADDITIONAL AMFE MODEL VARIANTS



### **S-AMFE** - AMFE with sensor connections

The AMFE not only releases the extinguishing gas but also signals that it has. In installations where accessibility is limited, the AMFE can be connected to a monitoring system by two connectors for reading a signal. Permanently controlling if the AMFE has been initiated (e.g. line control through a PLC or monitoring device) allows for precise knowledge about the status of whether and where a fire might have started in an otherwise hard to reach installation. The S-AMFE is rated for typical PLC signals of 24V/48V and 100mA. The connectors are standardized (6,3mm blade terminals), but customizations are possible.



### **R-AMFE** - AMFE which can additionally be triggered remotely

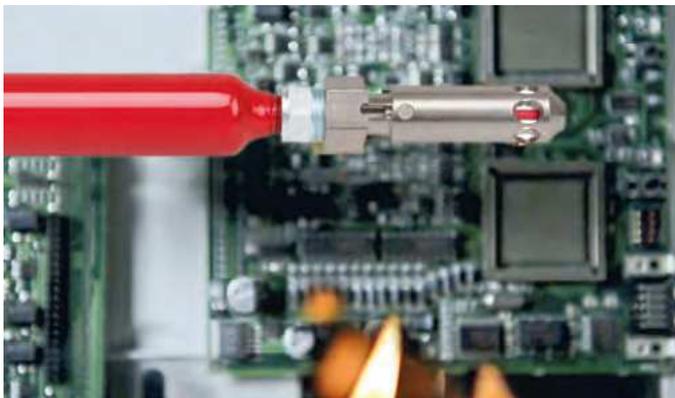
The R-AMFE works like a conventional AMFE, releasing the extinguishing gas when the thermobulb bursts after the activation temperature has been reached by heat (as in a sprinkler). Additionally, the R-AMFE can be remotely triggered by activating a current signal into the R-AMFE causing a fast and precise increase of the heat at the bulb, ultimately resulting in a burst of the thermobulb assembled and release of the extinguishing gas. R-AMFE can also work much faster than a traditional AMFE if controlled by a monitoring device which also reads e.g. smoke detector signals and, upon the early detection of smoke, initiates the signal to release the R-AMFE even before significant enough heat buildup. The applied current defines the time until the R-AMFE is initiated. As application requirements for the R-AMFE are customer specific, consulting the manufacturer is required to define electrical and mechanical details to guarantee reliable and sufficient operation.



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## THE CHALLENGE

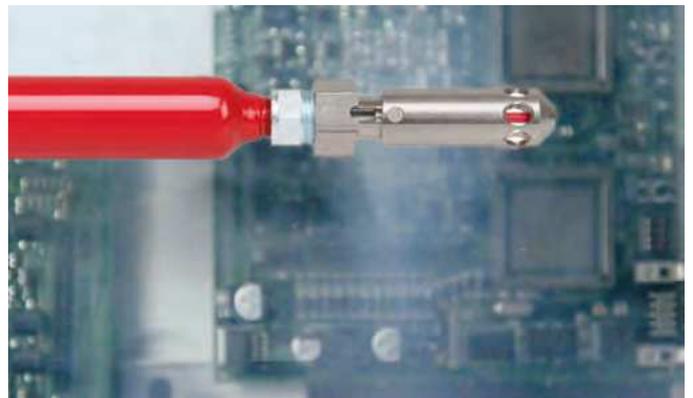
Washing machines, televisions or industrial power supplies - fires in electric devices are a continuously increasing serious threat. And not only at homes damage caused by fires are increasing. There is also a significant risk of fire in the industry and automotive sector. Another example are highly valued collections which are subject to persistent fire hazard. The challenge is to automatically, energy-supply independently, detect and to extinguishing fires already in the early stage, consequently providing more safety. A system is needed, that can extinguish these fires reliably, fast and easily at any time and without external resources inside a housing.



No rarity: A fire in an electric appliance (or on a PCB)

## THE FUNCTION

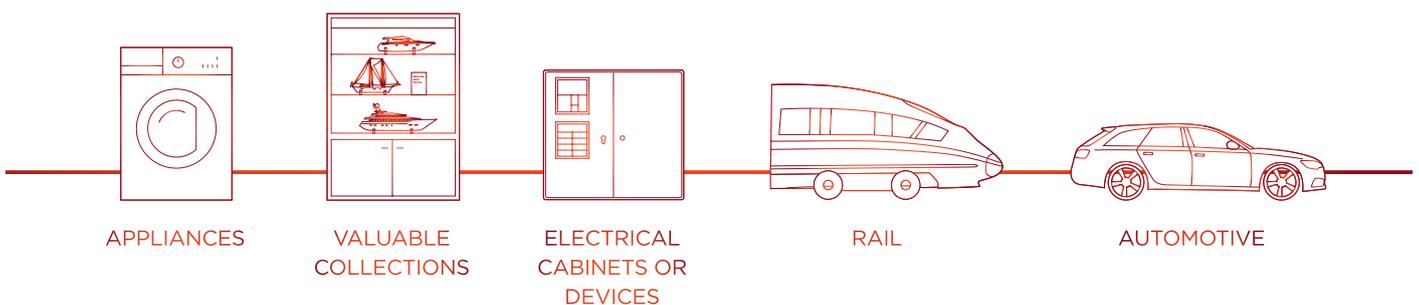
Due to rising heat in a fire scenario the pressure inside the glass bulb increases. After the predetermined operating temperature of the heat sensitive glass bulb is reached, the glass bulb bursts into small fragments and triggers a mechanism that releases the gas from the cylinder. The extinguishing medium is released through the holes in the outlet body and extinguishes the fire when the fire is still in an early stage. The quick operation and the effective extinguishing of the fire prevents further expansion of the fire and helps keep fire damage to a minimum.



Solution: The AMFE reliably extinguishes a fire

## APPLICATION VARIETY

The application spectrum of the AMFE is diverse: It ranges from technical household appliances, exhibits and collections to solutions in a vast variety of applications, both at home and in the industry.



# TECHNICAL SPECIFICATIONS

## Design Help & Configuration

Sizing the AMFE, (the necessary quantity of extinguishing agent) has to be carried out in accordance with locally relevant standards (e.g. NFPA 12, NFPA 2001, VdS 2093, EN 15004).

- Dimensions (without cylinder):  $\varnothing$  16 mm x 64 mm/0,63" x 2,52"
- Minimum installation depth: 20 mm/0,79" (w/o cylinders)
- Activation temperature: 57°C - 260°C/134,6° F - 500° F
- Extinguishing agents: 3M™ NOVEC™, CO<sub>2</sub>
- Lifetime: 9 years + (for the cylinders)
- Maintenance free
- Lifetime: for release mechanism (see manual for details)



Physical Dimensions Cylinder					Mounting Brackets	3M™ NOVEC™ as fire extinguishing agent			CO <sub>2</sub> as fire extinguishing agent	
						NOVEC™ Content	Protected volume [m <sup>3</sup> ]* with NOVEC™		CO <sub>2</sub> Weight [kg]	Protected free volume [m <sup>3</sup> ]** with CO <sub>2</sub> (NFPA 12, class A fire)
Size	Size Diameter x Length [inch]	Size Diameter x Length [inch]	Volume [Litre]	Volume [fl oz]	Recommended brackets [DIN 3016-1]	NOVEC Volume [ml]	Class A [E] fire (4,2% NFPA 2001)	Class B fire (5,9% NFPA 2001)		
#0	22x128	7/8 x 5.04	0,026	0,8	RGSS 22	24	0,06	0,04	n.a.	n.a.
#1	35x154	1 3/8 x 6.06	0,080	2,70	RGSS 35	72	0,19	0,14	0,035	0,037
#2	40x186	1 9/16 x 7.32	0,133	4,50	RGSS 40	120	0,32	0,23	0,060	0,075
#3	51x251	2 x 9.88	0,267	9,00	2x RSGU 56	241	0,64	0,46	0,135	0,084
#4	51x356	2 x 14.02	0,400	13,50	2x RSGU 56	360	0,96	0,69	0,200	0,124
#5	60x380	2 3/8 x 14.96	0,670	22,60	2x RSGU	603	1,61	1,15	0,350	0,217

Only for reference. The actual sizing is the responsibility of the customer. \*) Protected volumes are estimates. NFPA2001 (2012) standard formulas have been applied. KSS Fire Suppression Thermo Bulbs GmbH is not responsible for sizing. \*\*) Protected volumes are estimates. NFPA12 (2012) standard formulas have been applied. KSS Fire Suppression Thermo Bulbs GmbH is not responsible for sizing.

## PARTS

The parts below are available as standard. Other sizes and temperatures are available upon request.

AMFE			S-AMFE		
Part	Name	Description	Part	Name	Description
10899	AMFE SR3 68	AMFE, with KSS 68°C/155°F bulb	11043	S-AMFE SR3 68	AMFE, with KSS 68°C/155°F bulb and sensor connection
10900	AMFE SR3 79	AMFE, with KSS 79°C/175°F bulb	11044	S-AMFE SR3 79	AMFE, with KSS 79°C/175°F bulb and sensor connection
10901	AMFE SR3 93	AMFE, with KSS 93°C/200°F bulb	11045	S-AMFE SR3 93	AMFE, with KSS 93°C/200°F bulb and sensor connection

### CO<sub>2</sub> Cylinders

Size	Part	Name
#0	n.a.	n.a.
#1	10945	CO <sub>2</sub> 35g/100°C
#2	10946	CO <sub>2</sub> 60g/100°C
#3	10947	CO <sub>2</sub> 135g/100°C
#4	10948	CO <sub>2</sub> 200/100°C
#5	10949	CO <sub>2</sub> 350g/100°C

### 3M™ NOVEC™ Cylinders

Size	Part	Name
#0	11100	Cylinder NOVEC™ 26ml
#1	11101	Cylinder NOVEC™ 72ml
#2	11102	Cylinder NOVEC™ 120ml
#3	11103	Cylinder NOVEC™ 241ml
#4	11104	Cylinder NOVEC™ 360ml
#5	11105	Cylinder NOVEC™ 603ml



AMFE SR3 79°C  
PIN: 10900  
Date 16 JAN 2017 Batch No.  
AMFE: 046809

Name plate Example AMFE with batch number

## MARKING & TRACEABILITY

Each AMFE is marked with a label which, in addition to the type, production date and article number, also includes a batch number. This batch number guarantees a 100% traceability of all used components. Thus, not only information about the components being used can be retrieved, but also details about the executed quality tests during production.



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