Thermo Bulbs

AMFE

AUTOMATIC MINIATURE FIRE EXTINGUISHER

US 2017/0036048-A1 PATENT

BUILT-IN
SAFETY

JOB's 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.

Effectiveness verified by MPA Dresden
Test Report no. 2013-F- 4872

AMFE & CO_2 cylinder

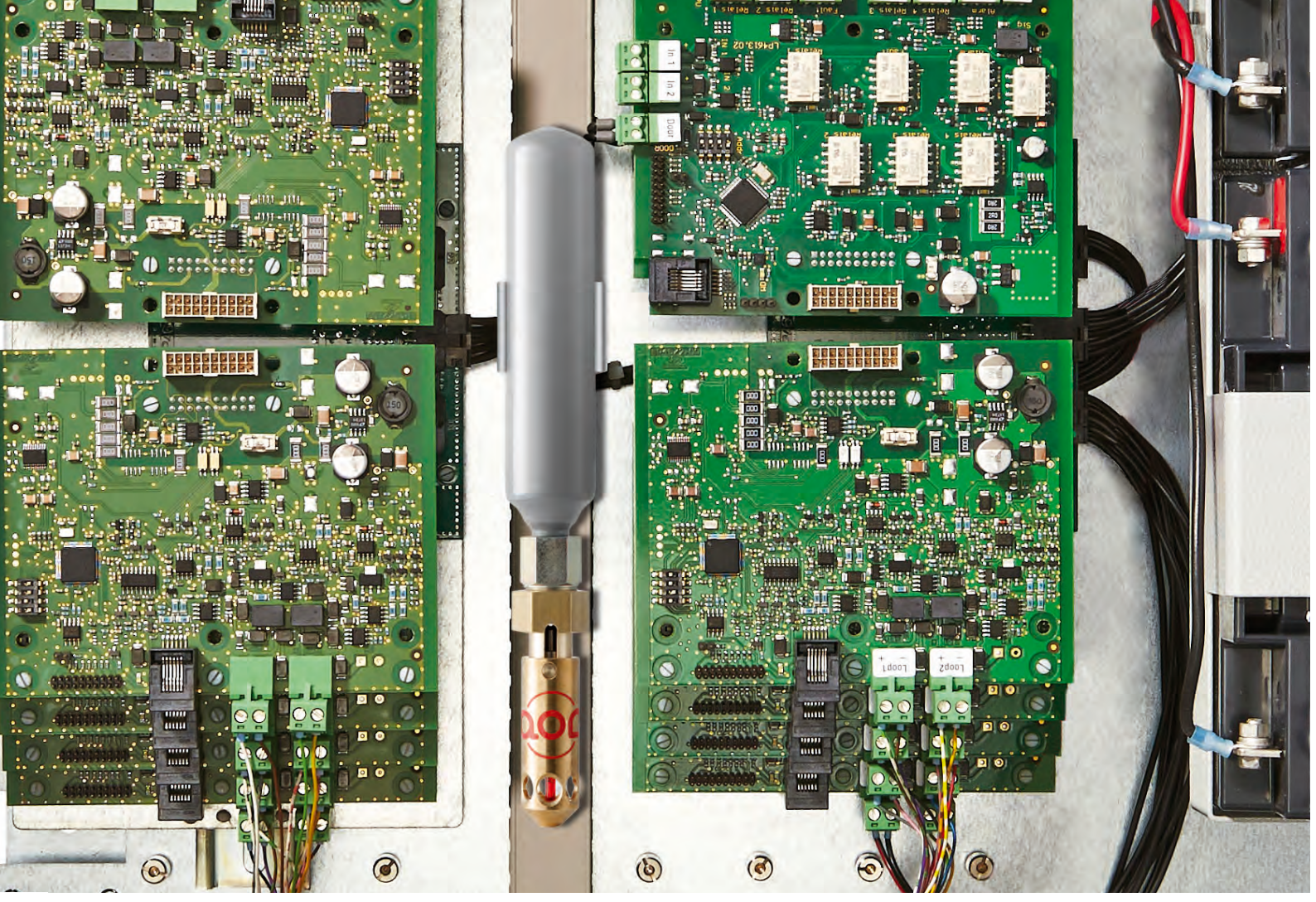
AMFE & 3M™ NOVEC™ cylinder

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

I-AMFE
(for redundancy or larger protected volumes - for CO_2 only)

THE ADVANTAGES AT A GLANCE:

- Easy to use
- Maintenance-free
- Easy to install (retrofittable)
- Variety of customer specific operating & releasing temperatures available
- No water being used (gas)
- Scalable
- Robust and shock tolerant
- 3M™NOVEC™ or CO_2 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 1000mA. The connectors are standardized (6,3mm blade terminals), but customizations are possible.

I-AMFE
Two simultaneously triggering connections

I-AMFE provides redundant provision of the extinguishing agent with simultaneous triggering of two connected cylinders. Alternatively, increasing the protected volume acc. to NFPA 12/NFPA 2001 is possible by installing the I-AMFE with two cylinders. It is also possible to connect two cylinders with different extinguishing agents for applications with other, very specific, fire extinguishing requirements. In certain countries, the largest possible CO_2 cylinder size which can be used without a special authorization is limited; cases where I-AMFE can still be used for maximizing the possible protected volume.

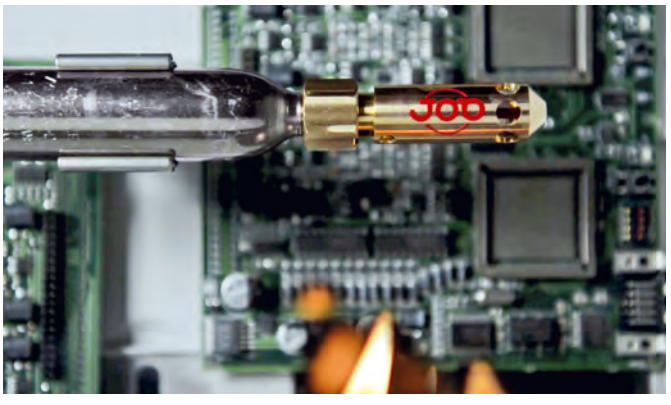
R-AMFE
AMFE which can additionally be triggered remotely

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 guaranty reliable and sufficient operation.

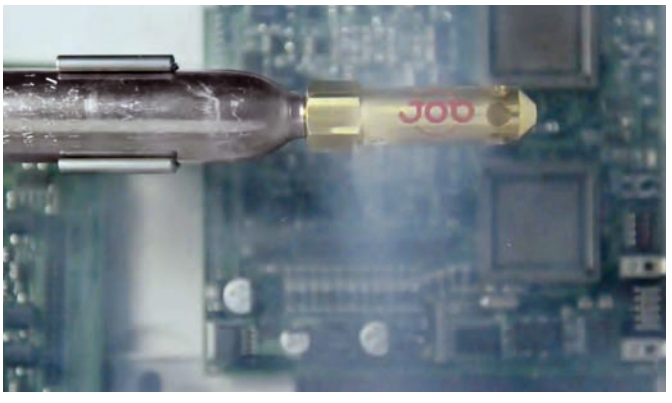
THE CHALLENGE

Washing machines, televisions or industrial power supplies – fires in electric devices are a continuously increasing serious threat. And not only at homes damages 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.

THE FUNCTION



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

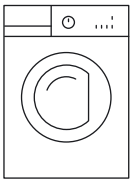


Solution: The AMFE reliably extinguishes a fire

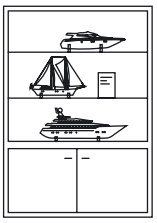
Due to rising heat in a fire scenario the pressure inside the glass bulb increases. After the predetermined operating temperature of the heat sensitive glass bulb is reached, the glass bulb bursts into small fragments and triggers a mechanism that releases the gas from the cylinder. The extinguishing 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 and helps keeping damage small.

APPLICATION VARIETY

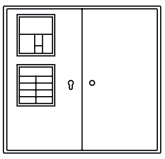
The application spectrum of the AMFE is diverse: It ranges from technical household appliances, exhibits and collections to solutions in a vast variety of applications, both at home and in the industry.



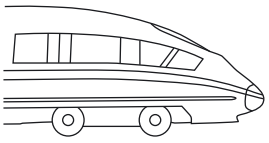
Appliances



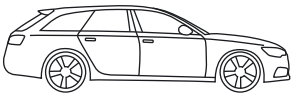
Valuable collections



Electrical cabinets or devices



Rail



Automotive

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): ø 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_2,
- Lifetime: 9 years + (for the cylinders)
- Maintenance free
- Lifetime: ∞ for release mechanism (see manual for details)

						3M™ NOVEC™ as fire extinguishing agent			CO_2 as fire extinguishing agent	
	Physical Dimensions Cylinder				Mounting Brackets	NOVEC™ Content	Protected volume [m³]* with NOVEC™			
Size	Size Diameter x Length [mm]	Size Diameter x Length [inch]	Volume [Liter]	Volume [floz]	Recommended brackets [DIN 3016-1]	NOVEC Volume [ml]	Class A[E] fire (4,2% NFPA 2001)	Class B fire (5,9% NFPA 2001)	CO_2 Weight [kg]	Protected free volume [m³]** with CO_2 (NFPA 12, class A fire)
#0	22x128	⅞ x 5.04	0,026	0,81	RGSS 22	24	0,06	0,04	n.a.	n.a.
#1	35x154	1⅜ x 6.06	0,080	2,70	RGSS 35	72	0,19	0,14	0,035	0,037
#2	40x186	1⁹⁄₁₆ 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	2⅜ x 14.96	0,670	22,60	2x RSGU 63	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. JOB Thermo Bulbs GmbH is not responsible for sizing.

**) Protected volumes are estimates. NFPA12 (2012) standard formulas have been applied. JOB 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

Part	Name	Description
10899	AMFE SR3 68	AMFE, with JOB 68°C/155°F bulb
10900	AMFE SR3 79	AMFE, with JOB 79°C/175°F bulb
10901	AMFE SR3 93	AMFE, with JOB 93°C/200°F bulb

S-AMFE

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

AMFE & S-AMFE are also available in stainless design

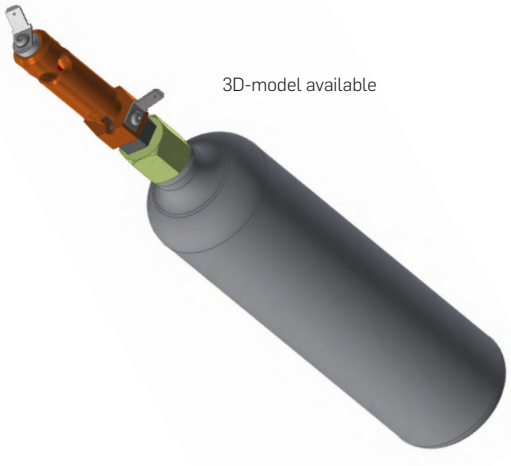
CO_2 Cylinders

Size	Part	Name
#0	n.a.	n.a.
#1	10945	CO2 35g/100°C
#2	10946	CO2 60g/100°C
#3	10947	CO2 135g/100°C
#4	10948	CO2 200/100°C
#5	10949	CO2 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

For R & I-AMFE, please contact JOB.



3D-model available

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.

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

Name plate Example AMFE with batch number

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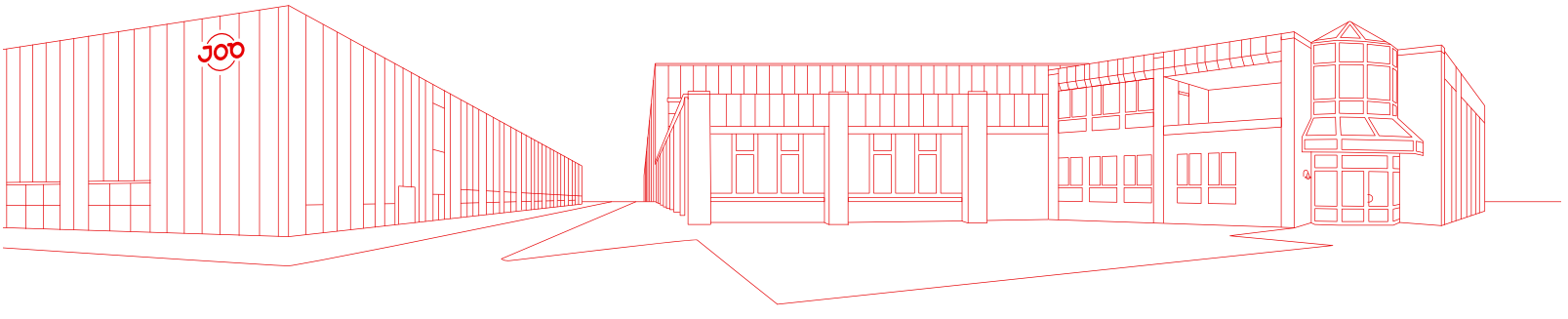

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