Version history

Version 1.0	draft, never published
Version 1.1	first published version (July 2020)
Version 1.2	spelling corrections and changed U_{signal} from 0V to 9V-24V (DC) (chapter 4)
Version 2.0	adding cylinders with pressure gauge and electronic sensors / VdS certification
Version 3.0	changing the branded name NOVEC to technical name FK-5-1-12, small wording correction, replaced cylinder pictures with version showing pressure gauges

1) Product Description

The S-AMFE line is an automatic miniature fire detection and suppression device with electric contacts working as an opening (normally closed) contact in case of activation. For details about intended use, product sizing (suitable protected volumes) please refer to the latest product manual available from JOB.

The S-AMFE product comprises two individual parts, which need to be assembled prior to use:

Activation head

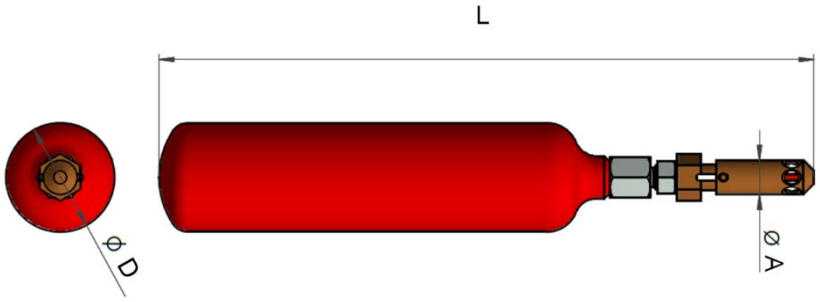
Extinguishing agent cylinder

The head is available in 4 different activation temperatures, the agent cylinder is available in 6 different sizes.

- 68°C / 155°F (red)
- 79°C / 175°F (yellow)
- 93°C / 200°F (green)
- 141°C / 286°F (blue)

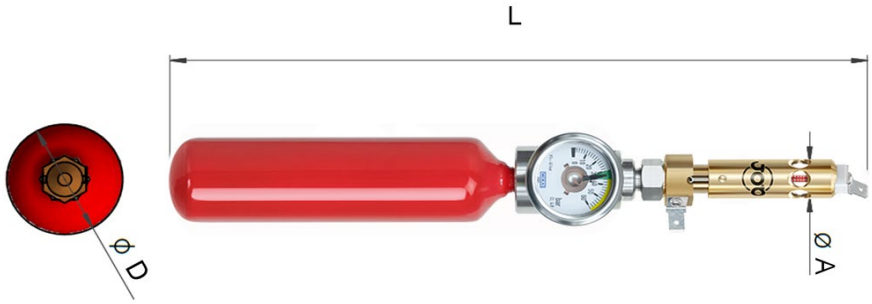
2) Dimensions and Weights

a. Standard cylinders

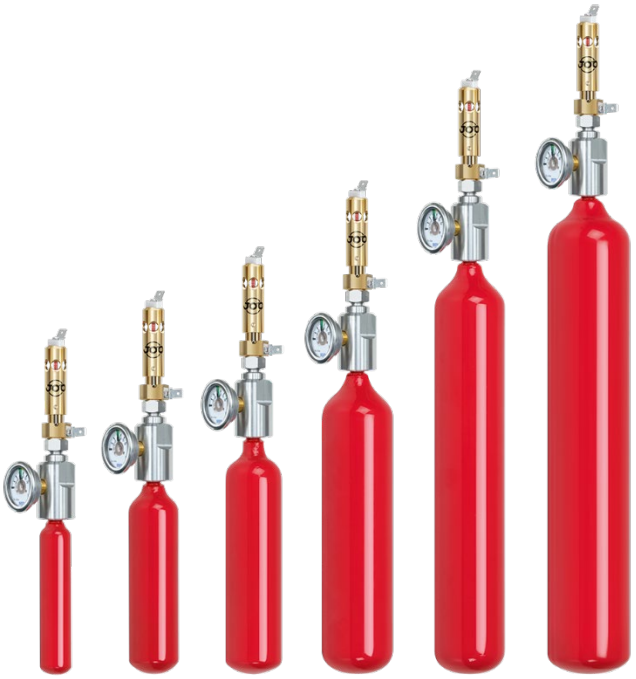


AMFE head with cylinder size	Metric [mm]			Imperial [inch]			Approximate weight	
	L	D	A	L	D	A	kg	lbs
0	194,5	22,0	16	7,66	0,87	0,63	0,25	0,55
1	210,0	35,0	16	8,27	1,38	0,63	0,44	0,97
2	240,5	40,0	16	9,47	1,58	0,63	0,63	1,39
3	307,0	50,8	16	12,09	2,00	0,63	1,23	2,71
4	392,0	50,8	16	15,44	2,00	0,63	1,70	3,75
5	438,0	60,3	16	17,25	2,38	0,63	2,70	5,96

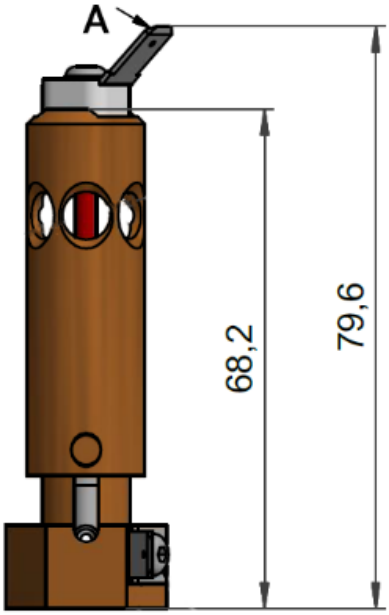
b. Cylinders with pressure gauge and electronic sensor (cable or M12 plug)



AMFE head with cylinder with gauge/sensor	Dimensions [mm]			Weight
	L	D	A	Kg (aprox.)
Size 0	264,5	22,0	16	0,45
Size 1	280,0	35,0	16	0,64
Size 2	310,5	40,0	16	0,83
Size 3	377,0	50,8	16	1,43
Size 4	462,0	50,8	16	1,90
Size 5	508,0	60,3	16	2,90



Size comparison of the 6 sizes (cylinder with gauge)



S-AMFE activation head dimensions

A → 6,8mm industry grade flat-connector

The weight of the S-AMFE initiation head is 78g.

The connection threading of the initiation head to the cylinder is M11 (M19 wrench).

3) Extinguishing agent

The cylinder is filled with FK-5-1-12 engineered extinguishing agent fluid and compressed nitrogen (N_2) as the propellant agent. The Material Safety Data Sheet of the extinguishing agent cylinders is attached in the addendum of this data-sheet.

The amount of FK-5-1-12 per cylinder size is as listed in the table below:

- Size 0 24ml
- Size 1 72ml
- Size 2 120ml
- Size 3 241ml
- Size 4 360ml
- Size 5 603ml

The ~ 10% propellant gas N_2 is compressed (<60bar).

The sizing and selection rules of the manufacturer apply (see product manual).

4) Electric Data

The S-AMFE can conduct an electric signal current when not initiated. Upon activation, this electric connection is interrupted permanently.

Type:	Normally closed contact
Signal current:	I_{max}= 50mA
Voltage:	U = 9..24V (DC)
Transition resistance:	R_t < 1.000mΩ
Connection:	6,8mm industry grade flat connector (blade terminals)

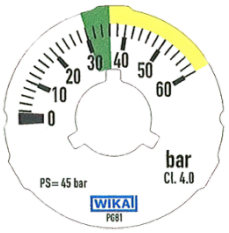
The signal current must not exceed 50mA to avoid unintentional overheating of the glass bulb (unintended activation).

The S-AMFE shall only be used with voltages lower than 60V DC (U_{signal}_max = 24V DC). In accordance with product safety guideline 2001/95/EG a protection against human contact is not mandatory.
Is the signaling voltage connected to the S-AMFE generated by a power transformer, the transformer must be designed based on EN 61558-2-6 (e.g. power transformer safety class III).

5) Data for pressure sensor and pressure gauge readings

a) Version with pressure gauge

The gauge display is in bar.



The cartridge with manometer is designed for an operating temperature range of $T_{Environment}$ = -20°C … +65°C.

The extinguishing agent cartridge must not be operated at ambient temperatures above +65°C on site to avoid any mechanical damage to the manometer!

The nominal range (green) for the internal pressure is

P_{nom} = 30 bar … 36 bar (@ $T_{Environment}$ = 20°C)

The gauge displays correctly in the following ambient temperature range

T_{min} = 15°C

T_{max} = 30°C

Beyond these temperature limits, the displayed value will deviate from the nominal value, and is not suitable for an inspection. In this case, the extinguishing unit

must be cooled down or heated up to a temperature value within the temperature range specified above, to get a qualitative conclusion on the internal pressure. It must be waited for the extinguishing agent cartridge to be completely heated up to this temperature range (recommended: $t_{Waiting\ time} \geq 30$ min) as otherwise the pressure indicator is not meaningful.

In the extinguishing unit's normal operation, the pressure indicator can be in the green and yellow display range. With increasing temperature at the installation site (e.g. when operating a protected control cabinet), the extinguishing unit's internal pressure will rise and display above the green range. This is the normal operational behavior.

b) Version with electronic sensor and cable:

Cable output (shielded)

Description	Color Code	Explaination
$U_{operation}$	brown (bn)	positive measure contact
0 V	blue (bl)	negative measure contact
n.a.	black (bk)	no function
and shield		

- Wires: 3 x 0.14 mm²
- Cable diameter: 4.3 mm
- Cable length: 2 m
- Measuring range: 0 … 60 bar (max. double overload capacity)
- Auxiliary voltage: 8 … 30 V DC
- Electric resistance: ≤ (auxiliary power – 8 V) / 0.02 A
- Measuring signal: 4 … 20 mA analog output signal
- Current output: corresponds to the measuring signal (max. 25 mA)
- Overvoltage protection: 36 V DC
- Short-circuit resistance: 750 V DC
- MTTF: >100 years

The pressure sensor must be supplied via an energy-limited circuit according to 9.4 of the UL/EN/IEC 61010-1 or LPS according to UL/EN/IEC 60950-1 or Class 2 according to UL1310/UL1585 (NEC or CEC).

The normal value range of the extinguishing agent cartridge's pressure is:

P_{nom} = 30 bar … 36 bar (@ $T_{Environment}$ = 20°C)

The normal value range for the version with electronic pressure sensor (electrical) is:

I_{nom} = 12 mA–13.6 mA

The operating temperature range of the cartridge with pressure sensor (cable) is:

$T_{Environment}$ = -30°C … +100°C

The functional temperature range is:

$T_{functional}$ = -30°C … +85°C

Note: At temperatures of over 85°C, the sensor indicates a non-defined current value of 25 mA.

The maximum temperature value up to which an evaluable current indicator is available is T_{Max} = +85°C. Everything above this is always 25 mA.

c) Version with electronic sensor and plug:

The electric data are the same as listed under subchapter b)

The connections are:

Connector (male) Output

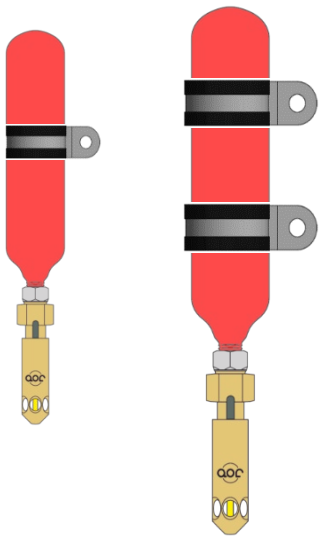
Description	Pin Number	Erläuterung
$U_{operation}$	1	positive measure contact
0 V	3	negative measure contact
n.a.	2 and 4	no function

See manual for details!

6) Holding brackets

Standard Application – normal vibration and shock robustness requirements
(Non-mobile applications, e.g. electrical cabinets, server racks, machines)

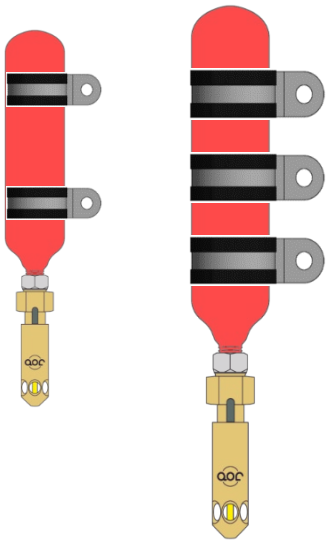
Size 0..2 *Size 3..5*



Part #	Name	for cylinder size	Reccomended number of brackets per cylinder
100651	AMFE mounting bracket set	0	1
100652	AMFE mounting bracket set	1	1
100653	AMFE mounting bracket set	2	1
100654	AMFE mounting bracket set	3 & 4	2
100655	AMFE mounting bracket set	5	2

Demanding Application – strong and permanent vibration, high shock robustness requirements (Mobile applications, e.g. marine, rail, automotive or semi-mobile equipment and machinery)

Size 0..2 *Size 3..5*



Part #	Name	for cylinder size	Reccomended number of brackets per cylinder
100651	AMFE mounting bracket set	0	2
100652	AMFE mounting bracket set	1	2
100653	AMFE mounting bracket set	2	2
100654	AMFE mounting bracket set	3 & 4	3
100655	AMFE mounting bracket set	5	3

7) Part numbers and nomenclature

For a complete system both an initiation head and a cylinder are required. Assembly is to be done in accordance with the instructions in the operating manual for the AMFE line.

S-AMFE initiation head ('s' for signal, 'sr' for metric treading for the FK-5-1-12 cylinders)

- S-AMFE SR3 68°C # 100592
- S-AMFE SR3 79°C # 100593
- S-AMFE SR3 93°C # 100594
- S-AMFE SR3 141°C # 100591

Extinguishing agent cylinders

- Cylinder FK-5-1-12 / 24ml Size 0 # 100708
- Cylinder FK-5-1-12 / 72ml Size 1 # 100709
- Cylinder FK-5-1-12 / 120ml Size 2 # 100710
- Cylinder FK-5-1-12 / 241ml Size 3 # 100711
- Cylinder FK-5-1-12 / 360ml Size 4 # 100712
- Cylinder FK-5-1-12 / 603ml Size 5 # 100713

Extinguishing agent cylinders with pressure gauge

- Cylinder FK-5-1-12 / 24ml Size 0 # 100772
- Cylinder FK-5-1-12 / 72ml Size 1 # 100773
- Cylinder FK-5-1-12 / 120ml Size 2 # 100774
- Cylinder FK-5-1-12 / 241ml Size 3 # 100775
- Cylinder FK-5-1-12 / 360ml Size 4 # 100776
- Cylinder FK-5-1-12 / 603ml Size 5 # 100778

Extinguishing agent cylinders with electronic sensor (2m / 6ft6" cable)

- Cylinder FK-5-1-12 / 24ml Size 0 # 100779
- Cylinder FK-5-1-12 / 72ml Size 1 # 100780
- Cylinder FK-5-1-12 / 120ml Size 2 # 100782
- Cylinder FK-5-1-12 / 241ml Size 3 # 100783
- Cylinder FK-5-1-12 / 360ml Size 4 # 100784
- Cylinder FK-5-1-12 / 603ml Size 5 # 100785

Extinguishing agent cylinders with electronic sensor (M12 plug)

- Cylinder FK-5-1-12 / 24ml Size 0 # 100787
- Cylinder FK-5-1-12 / 72ml Size 1 # 100788
- Cylinder FK-5-1-12 / 120ml Size 2 # 100789
- Cylinder FK-5-1-12 / 241ml Size 3 # 100790
- Cylinder FK-5-1-12 / 360ml Size 4 # 100791
- Cylinder FK-5-1-12 / 603ml Size 5 # 100792

8) Disclaimer

The S-AMFE is "Made-in-Germany".
The S-AMFE is CE marked (RoHS).
The S-AMFE is TÜV certified (EN45545 part 2, 4.2(h)).
The S-AMFE is REACH/RoHS conform.
The S-AMFE in combination with cylinders with gauge or sensors is VdS certified

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