DETECT-A-FIRE®

Detection and Release Devices

FEATURES

- Repeatable - self-restoring, nothing to replace, testable
- Rugged - withstands shock and vibration
- Versatile - various temperature settings available
- Durable - long lasting stainless steel shell
- Economical - wide spacings reduce installation costs
- Factory set
- Internal contact area hermetically sealed in stainless steel shell
- ROHS Compliant

APPLICATIONS

- Protection of schools, factories, offices, libraries, etc.
- Power generation
- Gas station islands
- Paint spray booths
- Range hoods
- Engine compartments

DESCRIPTION

DETECT-A-FIRE® detectors are the “heart” of many fire protection systems. These highly reliable devices have been a standard for over 65 years. Thousands of these detectors are in use controlling the release of extinguishants such as clean agents, CO2, water, or dry chemicals. In some systems, the device is used as an ALARM device, to sense overheat or fire and alert personnel.

DETECT-A-FIRE detectors have met with wide acceptance because they are designed with RATE COMPENSATION. This provides a unique advantage over both fixed temperature and rate-of-rise types of detectors because only the DETECT-A-FIRE detector accurately senses the surrounding air temperature regardless of the fire growth rate. At precisely the pre-determined danger point, the system is activated.

Fixed temperature detectors must be completely heated to alarm temperature and therefore a disastrous lag in time may occur with a fast rate fire. Rate-of-rise devices, on the other hand, are triggered by the rate of increase in ambient temperature and are subject to false alarms caused by harmless, transient thermal gradients such as the rush of warm air from process ovens.

The secret of the unit’s sensitivity is in the design (Figure 1). The outer shell is made of a rapidly expanding alloy, which closely follows changes in surrounding air temperature. The inner struts are made of a slower expanding alloy. Designed to resist thermal energy absorption and sealed inside the shell, the struts follow temperature changes more slowly.

A slow rate fire (Figure 2) will heat the shell and struts together. At the “set point”, the unit will trigger, actuating the alarm or releasing the extinguishant.

A transient rush of warm air up to 40°F/min. may expand the shell, but not enough to trigger the unit. By ignoring transient warm air excursions, the DETECT-A-FIRE detector virtually eliminates false alarms prevalent with rate-of-rise devices.

If a fast rate fire (Figure 3) starts, the shell will expand rapidly. The struts will close, actuating the alarm and/or releasing the agent. The faster the fire rate of growth, the sooner the DETECT-A-FIRE detector will react.

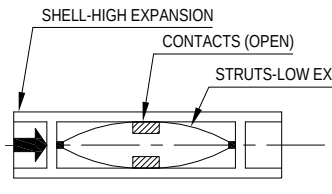


Figure 1: READ

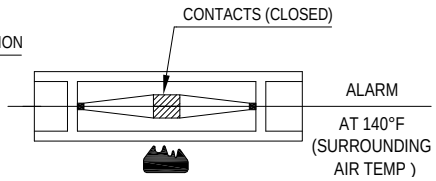


Figure 2: SLOW FIRE

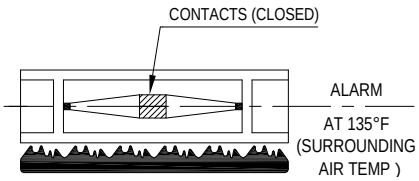


Figure 1: FAST FIRE

VERTICAL DETECT-A-FIRE DETECTOR SPECIFICATIONS

Vertical DETECT-A-FIRE detectors are designed for use in both “ordinary” or “hazardous” locations. For “ordinary” use, they may be mounted to any approved junction box with 7/8” diameter opening by using 1/2-14 NPT mounting nuts. The device may be wired in or out of conduit, depending on local preferences and codes. To facilitate supervision of system wiring, four lead wires are provided on normally open vertical units (that close on temperature rise). Per UL requirements, when mounted in a suitable fitting, instruments are Underwriters Laboratory and Underwriters Laboratory of Canada listed and Factory Mutual approved for hazardous locations.

VERTICAL MODELS

TABLE 1: MODEL NUMBER 27120*, 27121

X	°F Setting	°F Tolerance	Spacings (in feet)			RTI	Color Coding
			UL	ULc	FM		
E	140	+7/-8	50	50	20	Quick	Black
E	160	+7/-8	25	25	20	Quick	Black
E	190	+7/-8	50	50	25	Fast	White
E	210	+7/-8	25	50	25	Fast	White
E	225	+7/-8	25	50	25	Fast	White
F	275	±10	25	50	25	Fast	Blue
F	325	±10	50	50	25	Fast	Red
F	360	±10	25	50	30	V- Fast	Red
G	450	±15	25	50	30	V- Fast	Red
G	500	±15	50	50	30	V- Fast	Green
H	600	±20	N/A	50	30	V- Fast	Orange
H	725	±20	N/A	50	30	V- Fast	Orange

*27120 is a normally closed device and does not meet the requirements of NFPA-72 for use as an initiating device.

TABLE 2: MODEL NUMBER 28020*, 28021

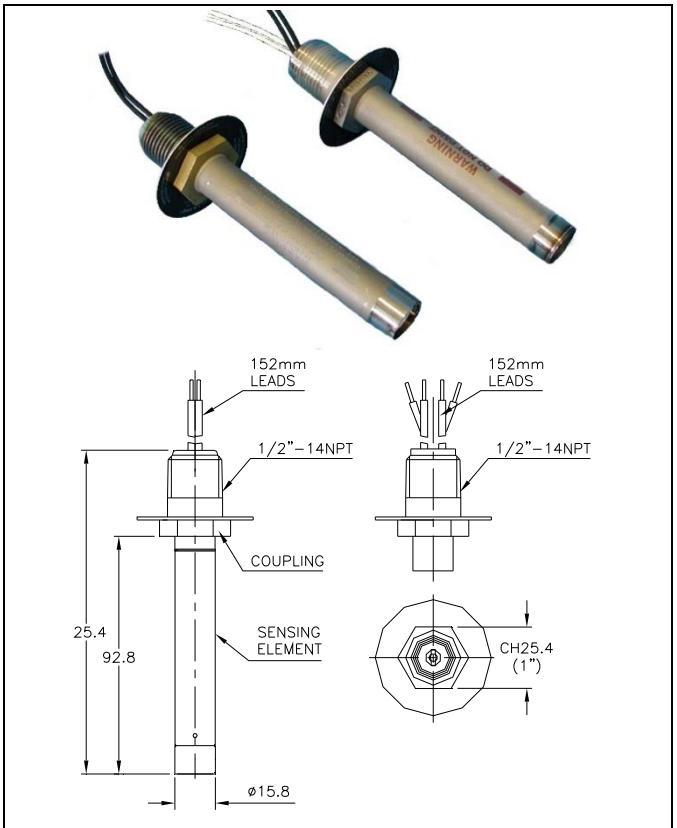
X	°F Setting	°F Tolerance	Spacings (in feet)			RTI	Color Coding
			UL	ULc	FM		
E	140	+7/-8	50	50	30	V- Fast	Black
E	160	+7/-8	25	25	30	V- Fast	Black
E	190	+7/-8	50	50	30	V- Fast	White
E	210	+7/-8	25	50	30	V- Fast	White
E	225	+7/-8	25	50	30	V- Fast	White
F	275	±10	25	50	30	V- Fast	Blue
F	325	±10	50	50	30	V- Fast	Red
F	360	±10	25	50	30	V- Fast	Red
G	450	±15	25	50	30	V- Fast	Green
G	500	±15	50	50	30	V- Fast	Orange
H	600	±20	N/A	50	30	V- Fast	Orange
H	725	±20	N/A	50	30	V- Fast	Orange

Note: For clean agents and CO_2 suppression systems, ceiling spacing 20 ft. apart unless otherwise specified.

Note: 28020 is a 2-wire device and RTI is not applicable.

* 28020 is a normally closed device and does not meet the requirements of NFPA-72 for use as an initiating device.

VERTICAL DESIGNS (HEXAGONAL HEAD)

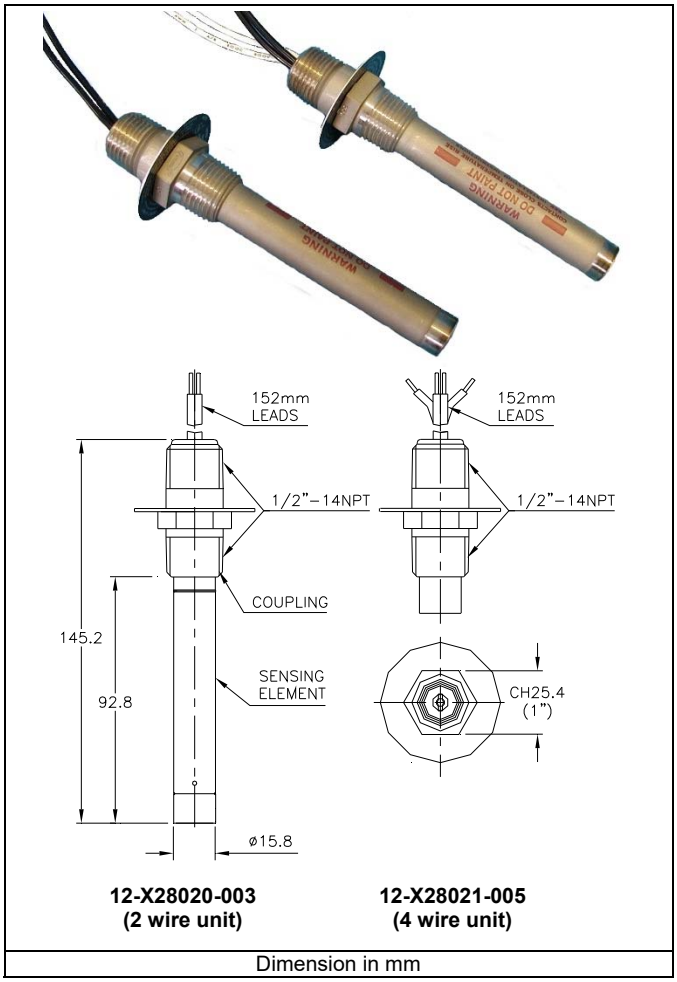


12-X27120-000
12-X27120-022
(2 wire unit)

12-X27121-000
12-X27121-020
(4 wire unit)

Dimension in mm

VERTICAL DESIGNS (COUPLING HEAD)



12-X28020-003
(2 wire unit)

12-X28021-005
(4 wire unit)

Dimension in mm

MOUNTING

DETECT-A-FIRE detectors are not position sensitive. Horizontal and vertical detectors refer to the most common mounting configuration for that unit. However, each type can be mounted either horizontally or vertically depending on the application and installation requirements.

TABLE 3

Hazardous Locations	Detector Type	Fitting Required For UL & ULC Listing and FM Approval
Class I, Groups A, B, C and D; Class II, Groups E, F and G	12-X27120-002 12-X27121-020 12-X28020-003 12-X28021-005	Mount detector to a suitable listed fitting in accordance with National Electric Code and/or local authority having jurisdiction.
Class I, Groups B, C and D; Class II Groups E, F and G	12-X27120-000 12-X27121-000	

Notes:

A. DETECT-A-FIRE temperature preset at factory only.

B. In applications where corrosion is suspect, care should be taken to protect the DETECT-A-FIRE detector to realize optimal performance and maximum life. Consult factory for fluorocarbon coating option.

C. Up to 375°F - #18 AWG Teflon insulated wire used on units. Above 375°F - #16 AWG TGGT insulated wire used on units.

D. For field wiring requirements please refer to DAF installation instructions.

E. Per UL521 requirements - low temperature exposure test is -22°F (-30°C).

F. DETECT-A-FIRE detectors are designed for long life expectancy, however due to various field conditions it is required that the detectors be tested annually per NFPA guidelines or local fire codes.

G. Replace DETECT-A-FIRE after any fire or heat related event, any mechanical damage, or after 10 years of continuous service.

H. UL of Canada labeling available upon request.

CONSTRUCTION

Stainless steel shell sensing element. Cold rolled steel mounting facility. Off-White finish.

TEMPERATURE SETTING SELECTION

Fenwal suggests selecting a DETECT-A-FIRE with a temperature setting a minimum of 100°F above the maximum ambient temperature expected.

Table 4 shows three categories of fire detection devices and their relative response levels for reaction to three different rate-of-rise conditions. Statistics indicate that 97% of all fires fall within these categories.

TABLE 4

	Rate-Of-Rise		
Type of Device	**Under 10°F/ Min**	**Between 10-40°F/Min**	**Over 40°F/Min**
Rate Compensated DETECT-A-FIRE Detector	FIRST	FIRST	SECOND but at selected protection level.
Fixed Temperature	SECOND	SECOND	THIRD
Rate-of-Rise	Will not operate unless fixed temperature supplement at 165°F is provided, then it is THIRD in sequence.	Will not operate unless fixed temperature supplement at 165°F is provided, then it is THIRD in sequence.	FIRST but may be a false alarm.

MODIFICATIONS

12-992012-XXX, Fluorocarbon coating, available on 27120-022, 27121-020, 28020-003, 28021-005 models only (500°F max.) for better corrosion resistance.

AGENCY LISTINGS

Fenwal DETECT-A-FIRE® detectors are UL and ULC listed and FM approved as fire detection thermostats (close on temperature rise) and as releasing devices (open on temperature rise).

TABLE 5

Agency	File Number	Location
UL	S492	Ordinary
UL	E19310	Hazardous
ULC	CS341-E	Ordinary and Hazardous
FM	J.I. OV2HO.AE	Hazardous
FM	17302	Ordinary
UL	S2410	Ordinary (600 & 725°F)
UL	E89599	Hazardous (600 & 725°F)

TABLE 5

DETECT-A-FIRE PART SELECTION GUIDE

Model Number	Mounting Head Material	Shell Material	Contact Operation on Temperature Rise	Electrical Rating (Resistive Only)	Approximate Weight per Unit
12-X27120-000 12-X27120-022	Brass Type 300 Stainless Steel	Type 300 Stainless Steel	Opens (450°F Max)	5.0 Amps 125 VAC 0.5 Amps 125 VDC	115g
12-X27121-000 12-X27121-020	Brass Type 300 Stainless Steel		Closes	5.0 Amps 125 VAC 0.5 Amps 125 VDC 2.0 Amps 24 VDC 1.0 Amps 48 VDC	115g
12X28020-003	Type 300 Stainless Steel		Opens (450°F Max)	5.0 Amps 125 VAC 0.5 Amps 125 VDC	145g
12-X28021-005	Type 300 Stainless Steel		Closes	5.0 Amps 125 VAC 0.5 Amps 125 VDC 2.0 Amps 24 VDC 1.0 Amps 48 VDC	145g

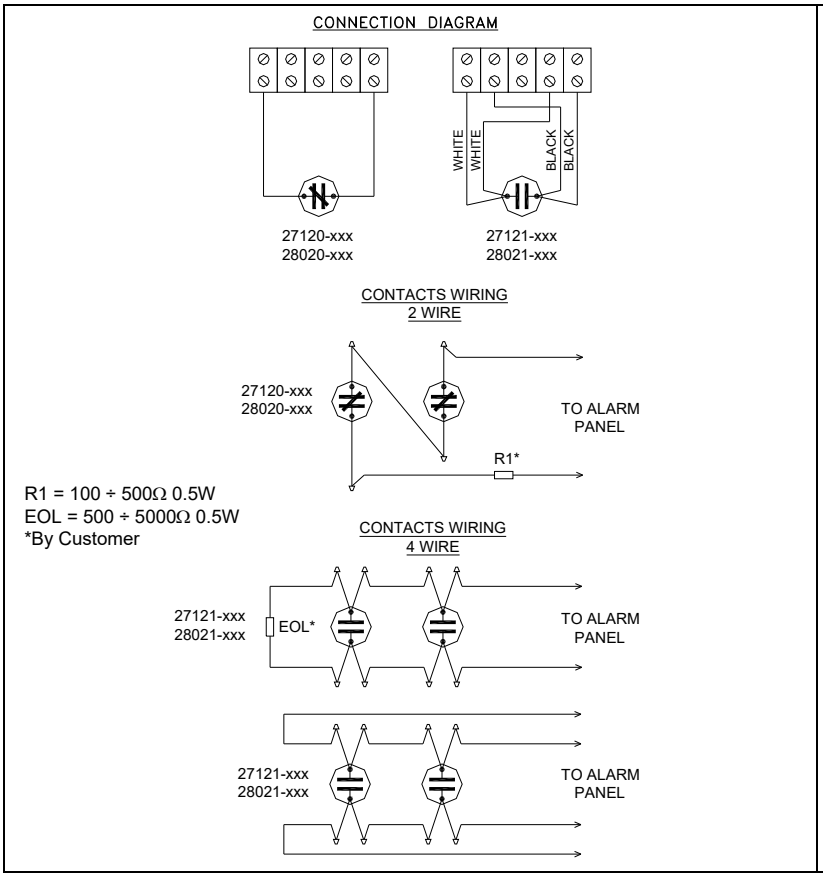
TABLE 6

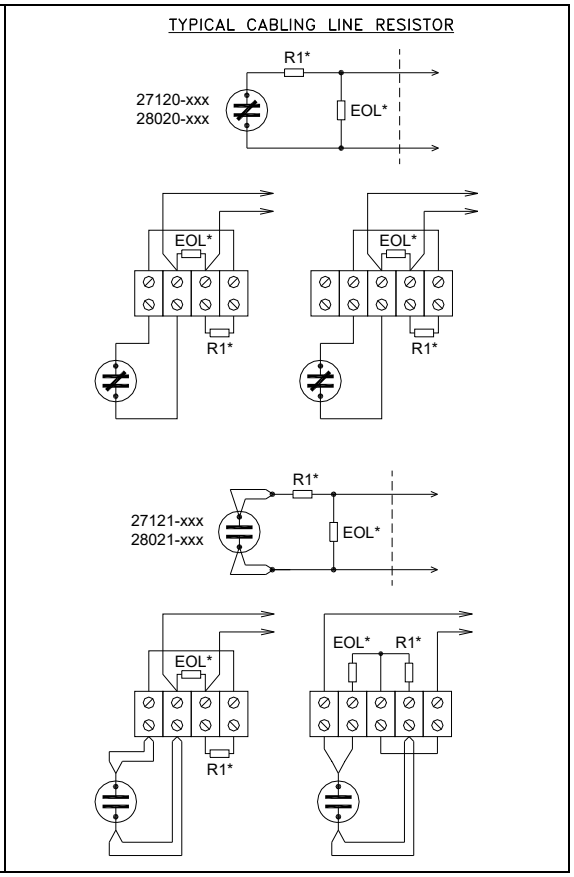
DETECT-A-FIRE RESPONSE TIME INTDEX (RTI)

Model P/N	Model Type	Contacts	Temperature (Set point)	Response Time Index (ft-s) [1/2]	RTI Classification	RTI Rated Spacing	Old Rated Spacing
27121-0	Vertical Brass Head	N/O	140°F (60°C) 160°F (71°C) 190°F (88°C) 210°F (99°C) 225°F (107°C) 275°F (135°C) 325°F (163°C) 360°F (182°C) 450°F (232°C) 500°F (260°C) 600°F (316°C) 725°F (385°C)	99 (140°F, 160°F) 148 (190°F, 210°F, 225°F, 275°F, 325°F, 360°F, 450°F, 500°F, 600°F, 725°F)	V-FAST	(30 X 30) ft (9 x 9) m	(25 x 25) ft (8 x 8) m
27121-20	Vertical Stainless Head	N/O					
28021-0	Vertical Brass Coupling Head	N/O					
28021-5	Vertical Stainless Coupling Head	N/O					

Note: Spaces shown are distances between units on smooth ceilings, the distances from partitions or walls would be half that shown. Authority having LOCAL jurisdiction should be consulted before installation.

ELECTRICAL CONNECTION





DETECT-A-FIRE in Ex-flameproof housing

Specification

- Fire Detector Temperature Switches, model:
  27000 series Rate Compensated
  28000 series Rate Compensated

Constructive Characteristics

- Ex d housing: Aluminum ASTM B-179-82 / AISI316L Cast iron available on request
- Electrical connection: 3/4" NPT-F / M20x1.5 / 1Gk
- Operation: OPEN/CLOSE on temperature rise

Construction

- Weatherproof: With degree of protection IP66 according to IEC 60529
- Flameproof: According to valid standards harmonized with regulations: ATEX, IECEx, GOST, INMETRO, DNV, UL & CSA
- Explosion proof enclosure with certificates UL QBCr7.E10518 & CSA 4418-02 013046_0_000 according to NEC standard Class I Div. 1 & 2 Groups A, B, C, D, Class II Div. 1 & 2 Groups E, F, G
- For the two available cable inlets, the manufacturer shall supply:
  1 temporary plastic plug
  1 plug according to selected certification
- Plug materials: Brass, carbon steel or SS316
- Housing material according to the below table:

Certification	Housing Material
CE-IP66	Aluminum, SS316L, Cast Iron
ATEX	Aluminum, SS316L, Cast Iron
IECEx	Aluminum, SS316L, Cast Iron
GOST	Aluminum, SS316L, Cast Iron
INMETRO	Aluminum, SS316L, Cast Iron
DNV	SS316L
CSA/UL	Aluminum

- Minimum temperature: -20°C for ATEX & IECEx
  -40°C on request
- Minimum temperature: -40°C for CE-IP66, GOST INMETRO & DNV
- Maximum temperature: 190°C or 220°C for CE-IP&& & DNV (NOTE: When is used with other certifications the Ta_{max} of the DNV certifications is equal to the selected one)
- Maximum temperature for ATEX, IECEx, GOST & INMETRO according to the below table:

Ex Classification	Ta max (°C)	Temp. Class (°C)	Cable Temp. (°C)
II 2GD/2G	65	T6	70
II 2GD/2G	95	T5	100
II 2GD/2G	120	T4	125
II 2GD/2G	130	T3	135
II 2GD/2G♦	145	T3	150
II 2G	190	T3	190
♦= Only for ATEX & GOST			

Certificates listings

DETECT-A-FIRE units are UL, ULc and FM listed, and ATEX, IECEx, GOST, INMETRO, DNV approved as fire detection thermostats (close on temperature rise) and as releasing devices (open on temperature rise).

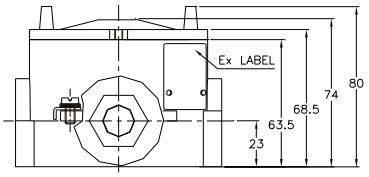
Regulations	Body	File Number	Location
CE-IP66	- - -	Terry Ferraris & C. declaration	Ordinary
ATEX	ICEPI	ICEPI 11 ATEX 03C001	Hazardous
IECEx	CESI	IECEx CES 12.0015	Hazardous
GOST	EAC	TC RU C-IT.ГБ05.B.00458	Hazardous
INMETRO	NCC	NCC 13 02619 X	Hazardous
DNV	DNV GL	TAA0000092	Hazardous
UL	UL	S492	Ordinary
UL	UL	E19310	Hazardous
ULc	ULc	CS341-E	Ord. & Haz.
FM	FM	J.I. 0V3H0.AE	Hazardous
FM	FM	17302	Ordinary
UL	UL	S2410	Ordinary*
UL	UL	E89599	Hazardous*

*600 & 725°F

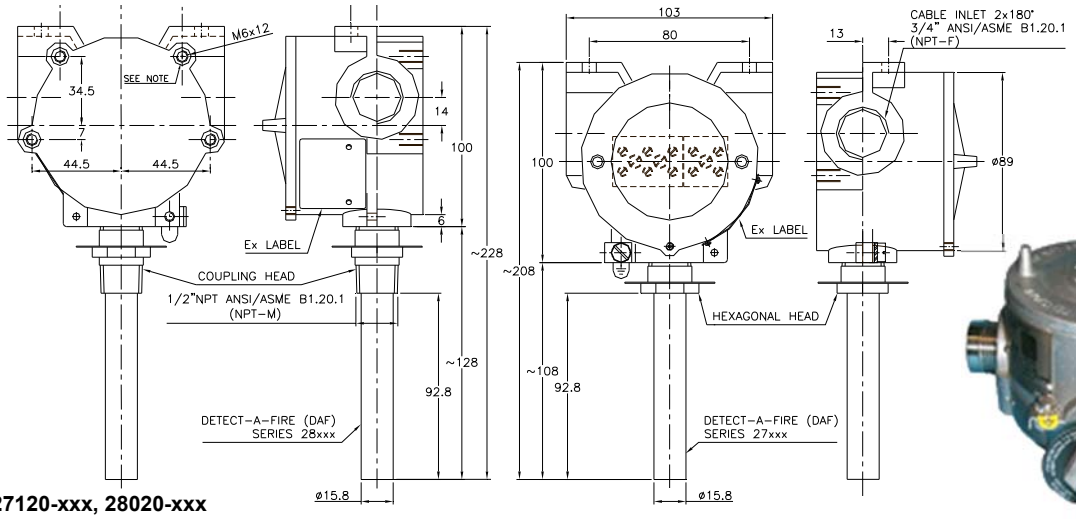
Ancillary equipments

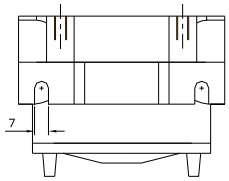
- IP66 housing with window and LED for power detection
- IP66 housing with window and LED to detect which DAF is switched on
- External test push button
- Test kit to check the DAF setting without disassembling it from its installation

Atex, IECEx, Gost, INMETRO & DNV
Ex d Flameproof housing
CE IP66 housing



Note
M6x12 self-threading bush are available only with aluminum enclosure.
The SS316L enclosure is tapped with N.4 threaded holes M6x12.





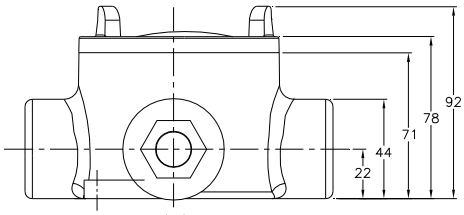
DAF series: 27120-xxx, 28020-xxx
Contacts open on temperature rise.

DAF series: 27120-xxx, 28020-xxx
Contacts open on temperature rise.

Contacts rating:

2A @ 24Vac/dc Resistive Load
1A @ 48Vac/dc Resistive Load
0.5A @ 115Vac/dc Resistive Load

UL & CSA
Ex d Flameproof housing



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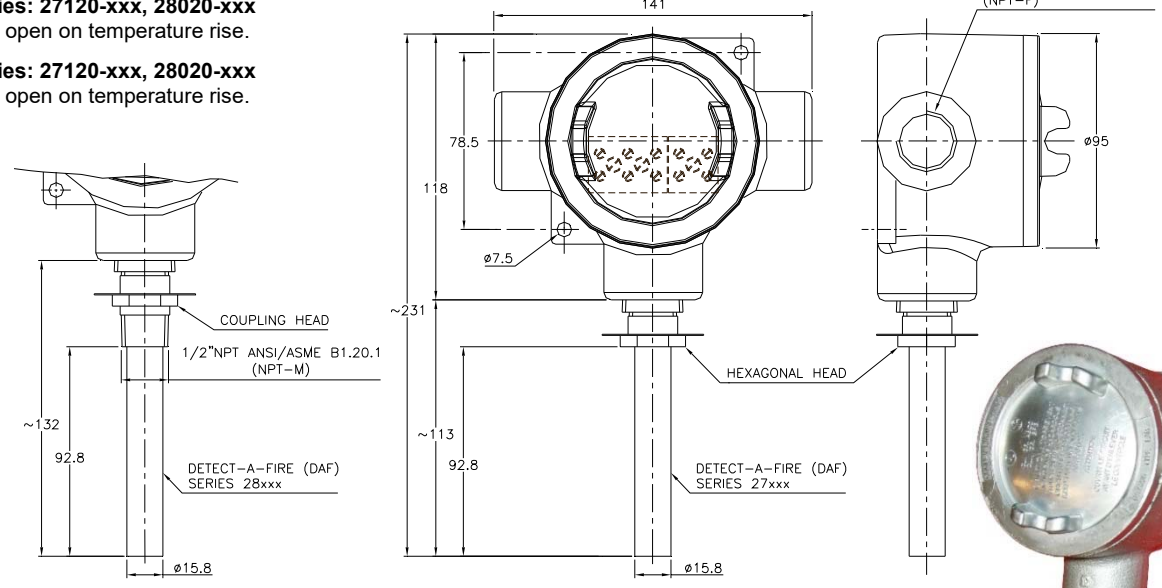

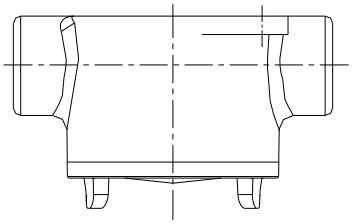

Contacts rating:

2A @ 24Vdc Resistive Load
1A @ 48Vdc Resistive Load
0.5A @ 125Vdc Resistive Load
5A @ 125Vac Resistive Load