

DETECT A FIRE®

Detection and Release Devices



ELECTRONIC
EQUIPMENT

ACOUSTIC

WEIGHING

ANTI-TILTING

VALVES

TEMPERATURE

**DETECT
A FIRE®**

FLOW/
RATE

DENSITY

INTERFACE

PRESSURE

LEVEL



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 75 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 predetermined 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.

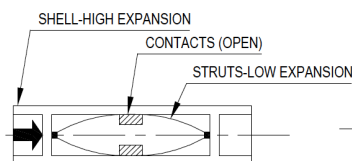


Figure 1: READY

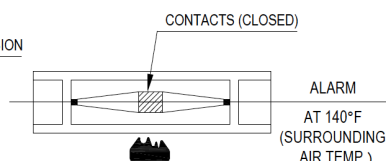


Figure 2: SLOW FIRE

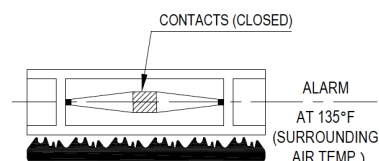


Figure 3: FAST FIRE

Fenwal® and DETECT-A-FIRE® are registered trademarks of Kidde-Fenwal Incorporated, Ashland, Massachusetts, USA

TERRY FERRARIS S.R.L.

Viale Ortles, 10 - 20139 Milano | Tel. 02 5391005 | Fax 02 5692864 | info@terryferraris.it | www.netaqua.it | www.terryferraris.it

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

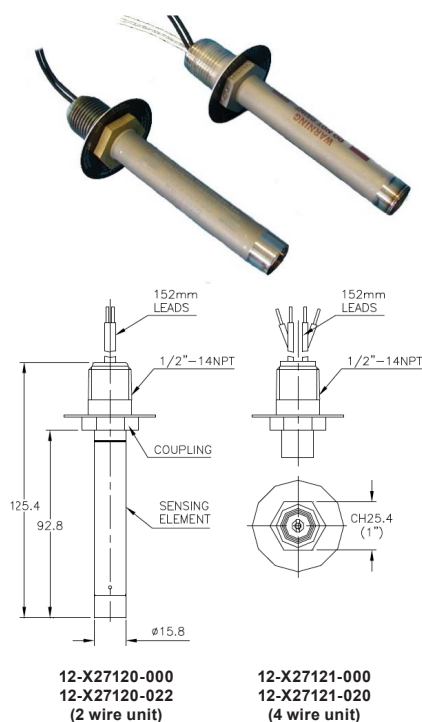
Table 1: model number 27121, 28021, 27120*, 28020*

°F Setting	°F Tolerance	°C Setting	°C Tolerance	Spacings (in feet)			RTI	Color Coding
				UL	ULC	FM		
140	+7/-8	60	+4/-5	50	50	20	V- Fast	Black
160	+7/-8	71	+4/-5	25	25	20	V- Fast	Black
190	+7/-8	88	+4/-5	50	50	25	V- Fast	White
210	+7/-8	99	+4/-5	25	50	25	V- Fast	White
225	+7/-8	107	+4/-5	25	50	25	V- Fast	White
275	±10	135	±6	25	50	25	V- Fast	Blue
325	±10	163	±6	50	50	25	V- Fast	Red
360	±10	182	±8	25	50	30	V- Fast	Red
450	±15	232	±10	25	50	30	V- Fast	Green
500	±15	260	±10	50	50	30	V- Fast	Orange
600**	±20	316	±12	N/A	50	30	V- Fast	Orange
725**	±20	385	±12	N/A	50	30	V- Fast	Orange

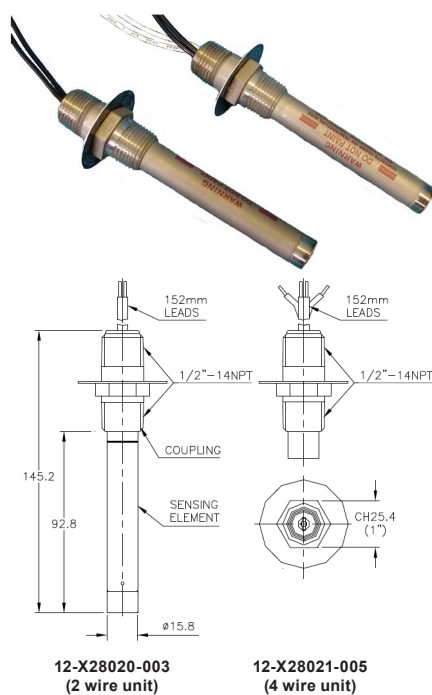
Notes:

- For clean agents or CO2 suppression systems, ceiling spacing is 20ft. apart unless otherwise specified.
- For NFPA Guidelines on ceiling height compensation, see Table 3 on page 3.
- *27120 and 28020 are normally closed devices and do not meet the requirements of NFPA-72 for use as initiating devices (they are 2-wire devices).
- *27120 and 28020 are not listed by FM with RTI.
- ** Not available for Normally Closed detectors

Vertical designs (hexagonal head) Dimensions in mm



Vertical schemes (coupling head) Dimensions in mm



DETECT-A-FIRE® Detection and Release Devices by Terry Ferraris Milano

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 2

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 Class I, Groups 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. DETECT-A-FIRE detectors are CE Listed. The product family has been evaluated in accordance with IEC 60947-1 and IEC 60947-5-1, and is documented under Intertek Report No. 102294754 BOX-001 as an overheat detector. Detectors have a rated insulation and impulse voltages of 1500 VAC.

Table 3: derating factor for ceiling height

Heat Detector Spacing Reduction Based on Ceiling Height				
Ceiling Height Above		Up to and Including		Derating factor
m	ft	m	ft	
0	0	3.05	10	1.00
3.05	10	3.66	12	0.91
3.66	12	4.27	14	0.84
4.27	14	4.88	16	0.77
4.88	16	5.49	18	0.71
5.49	18	6.10	20	0.64
6.10	20	6.71	22	0.58
6.71	22	7.32	24	0.53
7.32	24	7.93	26	0.46
7.93	26	8.54	28	0.40
8.54	28	9.14	30	0.34

This table outlines the derating factor required depending on ceiling height based on NFPA 72 guidelines for D-A-F detector installation.

Construction

- Stainless steel shell sensing element. Cold rolled steel mounting facility. Off-White finish.
- #18 AWG Teflon™ insulated wire is used on detectors exposed to temperatures up to 375°F.
- #16 AWG TGGT insulated wire is used on detectors exposed to temperatures above 375°F.

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.

Device selection

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	THIRD	THIRD	FIRST but may be a false alarm

Modifications

- Add ULC Label to any temperature setting.
- Add fluorocarbon coating, available on 27120-022, 27121-020, 28020-003, 28021-005 models only (500°F max.) for better corrosion resistance.
- Add extended leadwires on select models and temperatures.

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 4

Agency	File Number	Location
UL	S492	Ordinary
UL	E19310	Hazardous
ULC	CS341-E	Ordinary and Hazardous
FM	J.I. 0V2H0.AE	Hazardous
FM	17302	Ordinary
UL	S2410	Ordinary (600 & 725°F)
UL	E89599	Hazardous (600 & 725°F)
CE	IEC 60947-5-1	-

DETECT-A-FIRE® Detection and Release Devices by Terry Ferraris Milano

Table 5: Detect-a-fire part selection guide

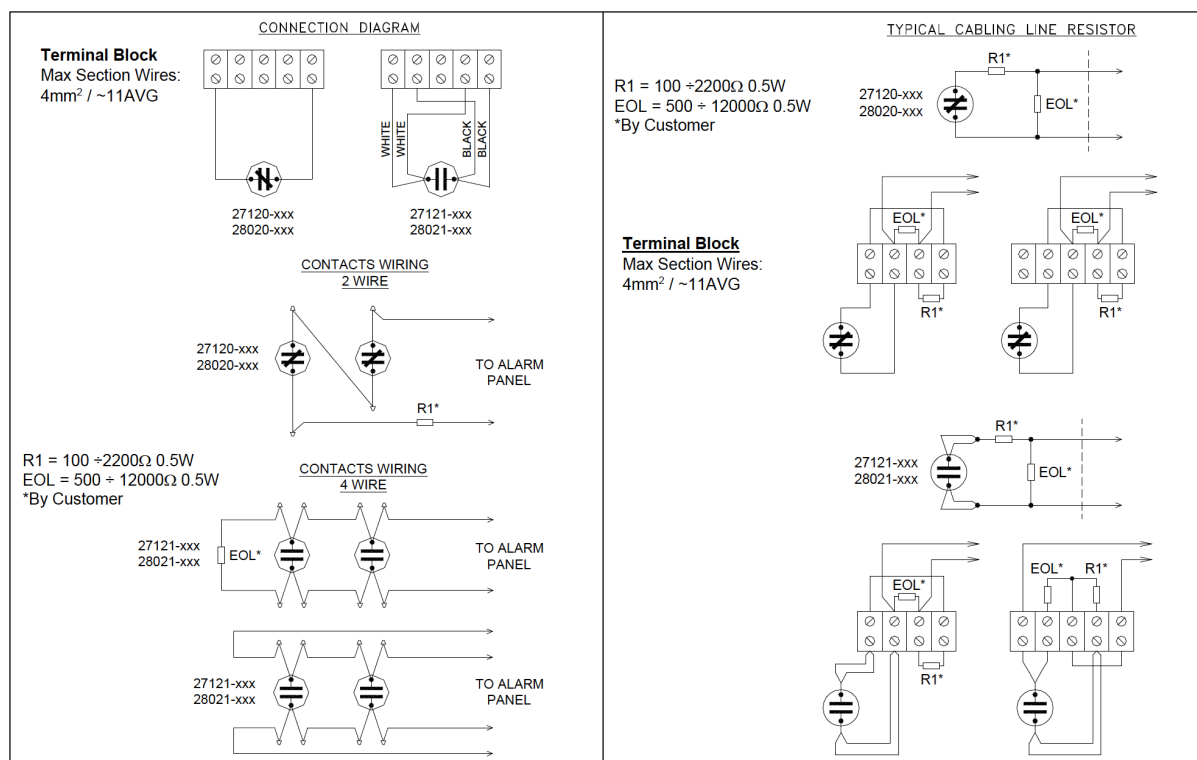
Model Number	Head Material	Shell Material	Contact Operation	Electrical Rating (Resistive Only)	Approximate Weight per Unit
12-X27120-000	Brass	Type 300 Stainless Steel	Normally Closed	5.0 Amps 125 VAC 0.5 Amps 125 VDC	145g
12-X27120-022	Type 300 Stainless Steel				
12-X27121-000	Brass		Normally Open	5.0 Amps 125 VAC 0.5 Amps 125 VDC 2.0 Amps 24 VDC 1.0 Amps 48 VDC	145g
12-X27121-020	Type 300 Stainless Steel				
12X28020-003	Type 300 Stainless Steel		Normally Closed (Open on Rise)	5.0 Amps 125 VAC 0.5 Amps 125 VDC	145g
12-X28021-005	Type 300 Stainless Steel		Normally Open (Close on Rise)	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 index (rti) and spacing

Model P/N	Model Type	Contact Operation	Temperature (Set Point)	Response Time Index (ft-s) ^{1/2}	RTI Classification	RTI Rated Spacing	Old Rated Spacing
12-X27121-000	Vertical Brass Hexagonal Head	N/O	140°F (60°C) 160°F (71°C) 190°F (88°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
12-X27121-020	Vertical Stainless Hexagonal Head	N/O	210°F (99°C) 225°F (107°C) 275°F (135°C) 325°F (163°C) 360°F (182°C)				
12-X28021-005	Vertical Stainless Coupling Head	N/O	450°F (232°C) 500°F (260°C) 600°F (316°C) 725°F (385°C)				

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 and Explosionproof 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 / 1" GK
- Operation: OPEN/CLOSE on temperature rise
- Terminal block: 4mm² / ~11AVG

Construction

- Weatherproof: With degree of protection IP66 according to IEC 60529
- Flameproof: According to valid standards harmonized with regulations: ATEX, IECEx, EAC-Ex, INMETRO, DNV, KCs, UL, CSA, cUL, PESO, EQM.
- Explosion proof enclosure with certificates UL QBCR.E10518, cUL 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 & Approval	Housing Material
CE-IP66	Aluminum, SS316L, Cast Iron
ATEX	Aluminum, SS316L, Cast Iron
IECEx	Aluminum, SS316L, Cast Iron
EAC-Ex	Aluminum, SS316L, Cast Iron
INMETRO	Aluminum, SS316L, Cast Iron
PESO	Aluminum, SS316L, Cast Iron
DNV	SS316L
CSA / cUL / UL	Aluminum
KCs	Aluminum, SS316L, Cast Iron
SIL	Aluminum, SS316L, Cast Iron
EQM	Aluminum, SS316L, Cast Iron

- Minimum temperature: -40°C for CE-IP66, ATEX, IECEx, EAC-Ex, INMETRO, DNV, KCs, PESO, UL, CSA, cUL, EQM.
Maximum temperature: 190°C or 220°C for CE-IP66 & DNV (NOTE: When is used with other certifications the Tamax of the DNV certifications is equal to the selected one) 190°C for UL, CSA, cUL.
- Maximum temperature for ATEX, IECEx, EAC-Ex, INMETRO, KCs, PESO and EQM 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/26*	145	T3	150
II 2G	190	T3	190

*Only for EAC-Ex



Certificates & Approval listings

DETECT-A-FIRE units are UL, cUL, ULC, CSA and FM listed, and ATEX, IECEx, EAC-Ex, INMETRO, KCs, DNV, PESO, EQM and SIL 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 declaration	Ordinary
ATEX	CESI	19 ATEX 066	Hazardous
IECEx	CESI	IECEx CES 12.0015	Hazardous
EAC-Ex	EAC	RU C-IT AA87.B.00312-20	Hazardous
INMETRO	NCC	NCC 13 2619 X	Hazardous
DNV	DNV GL	TAA0000092	Hazardous
PESO	PESO	P402286/1	Hazardous
UL	UL	S492	Ordinary
UL	UL	E19310	Hazardous
ULC	ULC	CS341-E	Ord. & Haz.
FM	FM	J.I. 0V2HO.AE	Hazardous
FM	FM	17302	Ordinary
UL	UL	S2410	Ordinary*
UL	UL	E89599	Hazardous*
KCs	KTL	21-KA4B0-0173 & 21-KA4B0-0298	Hazardous
UL	UL	QBCR.E10518	Hazardous
cUL	cUL	QBCR7.E10518	Hazardous
EQM	Intertek	25-01-23624/Q25-01-049902/NB0007	Hazardous

*600 & 725°F

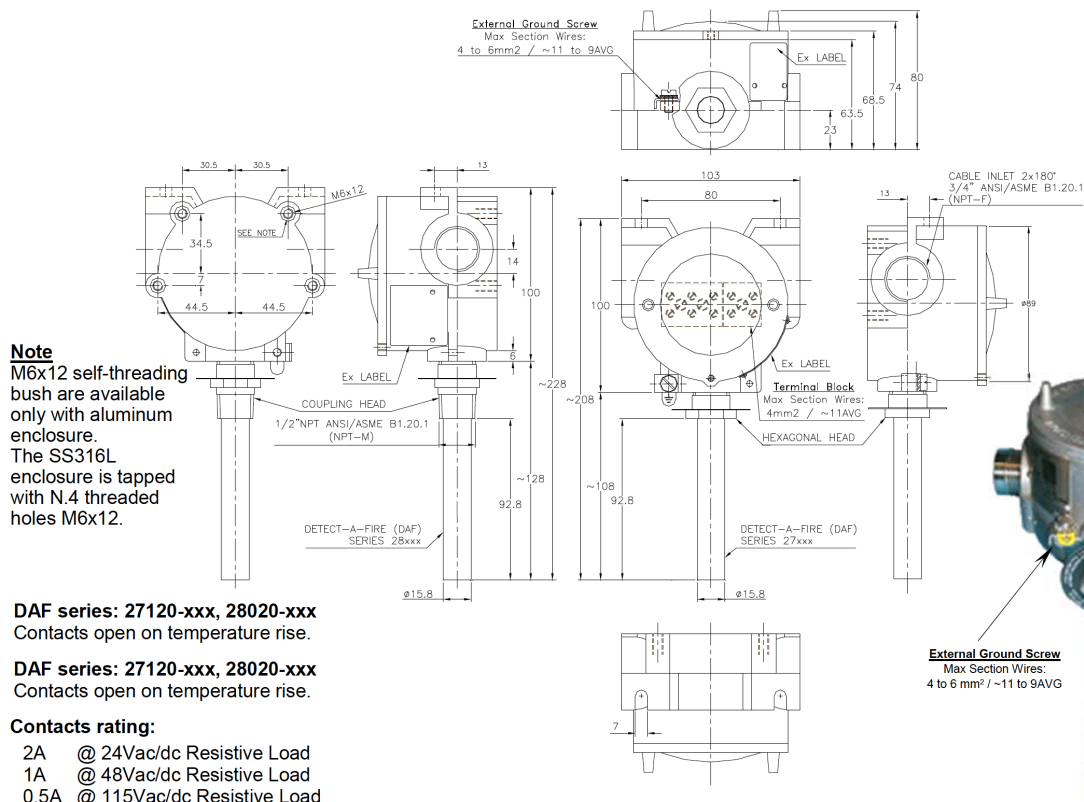
Ancillary equipments

- 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

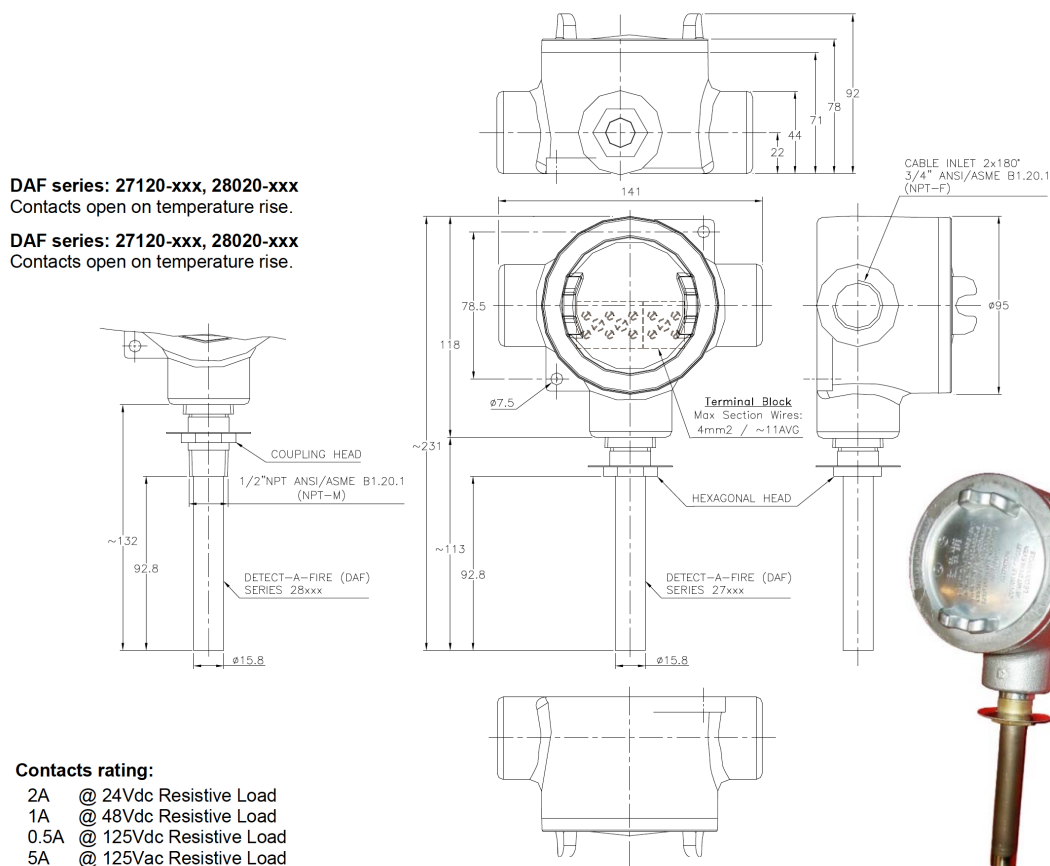


DETECT-A-FIRE® Detection and Release Devices by Terry Ferraris Milano

ATEX, IECEX, EAC-Ex, INMETRO, KCs, DNV, EQM, PESO Ex d Flameproof housing CE IP66 housing



UL, cUL, CSA Explosionproof housing



DETECT-A-FIRE® Detection and Release Devices by Terry Ferraris Milano

Configuration list

Configuration example:

2 7 1 2 1 0 0 C A 2 5 2 3 2

Ref. Item 1 2 3 4 5 6 7 8 9 10 11 12 13 14

Ref. Item						DNV-ATEX - SS316L 3/4"NPT-F
1	2	3	4	5	27000 Series - Hexagonal Head	5 DNV-ATEX - SS316L M20x1.5
2	7	1	2	0	Opens on temperature rise	6 DNV-IECEX - SS316L 3/4"NPT-F
2	7	1	2	1	Closes on temperature rise	7 DNV-IECEX - SS316L M20x1.5
1	2	3	4	5	37000 (27000) Series - Hexagonal Head SIL2	8 DNV- EAC-Ex - SS316L 3/4"NPT-F
3	7	1	2	0	Opens on temperature rise	9 DNV-INMETRO - SS316L 3/4"NPT-F
3	7	1	2	1	Closes on temperature rise	
1	2	3	4	5	47000 (27000) Series - Hexagonal Head PESO+SIL2	10 Plug
4	7	1	2	0	Opens on temperature rise	0 No Plug
4	7	1	2	1	Closes on temperature rise	1 N.2 Plugs 3/4" carbon steel (CE-IP66, ATEX, IECEX)
1	2	3	4	5	28000 Series - Coupling Head	2 N.1 Plug 3/4" carbon steel (CE-IP66, ATEX, IECEX)
2	8	0	2	0	Opens on temperature rise	2 N.1 Plug 3/4" SS316 (cCSAus) (only for UL, CSA / cUL)
2	8	0	2	1	Closes on temperature rise	3 N.1 Plug 3/4" SS316 (CE-IP66, ATEX, IECEX)
1	2	3	4	5	38000 (28000) Series - Coupling Head SIL2	4 N.2 Plugs 3/4" SS316 (CE-IP66, ATEX, IECEX)
3	8	0	2	0	Opens on temperature rise	5 N.1 Plug 1" carbon steel (CE-IP66, ATEX, IECEX)
3	8	0	2	1	Closes on temperature rise	9 N.1 Plug M20x1.5 SS316 (CE-IP66, ATEX, IECEX, EAC-Ex)
1	2	3	4	5	48000 (28000) Series - Coupling Head PESO+SIL2	11 Finishing
4	8	0	2	0	Opens on temperature rise	0 Only DETECT-A-FIRE
4	8	0	2	1	Closes on temperature rise	4 Stainless steel original colour
						5 Aluminum original colour
						6 One colour painting (outside) aluminum
						7 Two-colour painting (inside/outside) aluminum
						8 Corrosion resistance treatment Zancofuso Aluminum* (available only for suffix A, B, D, O, N, L, K, Q, V, W)
						12 Terminals
						0 Only DETECT-A-FIRE
						1 2 terminals
						2 5 terminals (must be used with 27121, 28021)
						3 Back Plate Threaded 6MA Holes 5-Terminals (only for Aluminum Housing Materials)
						4 Back Plate Threaded 6MA Holes 2-Terminals (only for Aluminum Housing Materials)
						5 4 terminals
						6 Back Plate Threaded 6MA Holes 4-Terminals (only for Aluminum Housing Materials)
						13 Category & Ta min
						0 Only DETECT-A-FIRE
						1 CE-IP66 -40°C; or UL**, or CSA / cUL **
						2 2GD -40°C (ATEX, IECEX, EAC-EX, INMETRO, KCs, EQM) DNV
						5 2G -40°C (ATEX, IECEX, EAC-EX, INMETRO, KCs, EQM) DNV
						6 DNV -40°C
						14 Ta max
						0 Only DETECT-A-FIRE
						1 190°C CE-IP66 (setting ≤360°F); or UL**, or CSA / cUL **
						2 65°C (2GD & 2G: ATEX, IECEX, EAC-EX, INMETRO, KCs, EQM)
						3 95°C (2GD & 2G: ATEX, IECEX, EAC-EX, INMETRO, KCs, EQM)
						4 120°C (2GD & 2G: ATEX, IECEX, EAC-EX, INMETRO, KCs, EQM)
						5 130°C (2GD & 2G: ATEX, IECEX, INMETRO, KCs, EQM)
						6 145°C (2GD & 2G: only for EAC-EX)
						7 185°C (2G: ATEX, IECEX, EAC-EX, INMETRO, KCs, EQM)
						8 220°C CE-IP66 (setting ≥450°F)
						9 190°C DNV (setting ≤360°F)
						A 220°C DNV (setting ≥450°F)
						B 65°C (2GD & 2G: ATEX, IECEX, EAC-EX, INMETRO, KCs, EQM) DNV***
						C 95°C (2GD & 2G: ATEX, IECEX, EAC-EX, INMETRO, KCs, EQM) DNV***
						D 120°C (2GD & 2G: ATEX, IECEX, EAC-EX, INMETRO, KCs, EQM) DNV***
						E 130°C (2GD & 2G: ATEX, IECEX, INMETRO, KCs, EQM) DNV***
						F 145°C (2GD & 2G: only for EAC-EX) DNV***
						G 185°C (2G: ATEX, IECEX, EAC-EX, INMETRO, KCs, EQM) DNV***
						* Minimum quantity 300 pcs.
						** In case of UL and CSA / cUL, the enclosure and the DAF are delivered with specific dedicated certification.
						*** When are used with the DNV certification the Ta max of the DNV certification is equal to the selected one.
						**** Cast iron housing available on request.