TELEDYNE
OLDHAM SIMTRONICS
Everywhereyoulook™

SAFETY MANUAL – DF-TV7-T & DF-TV7-V FLAME DETECTORS

INTRODUCTION

This manual describes the safety related information for the installation, operation, configuration, and maintenance of the DF-TV7-T and DF-TV7-V Flame Detectors.

For complete information regarding performance, installation, operation, maintenance and specifications of the detectors, please refer to the operating manual NOSP17662.

The MultiFlame product family consists of two detector versions:

- DF-TV7-T multi-spectrum IR Flame detector
- DF-TV7-V combined UV and IR

Both detectors are classified as Type B field device according to IEC61508.

They both provide a 4-20mA analog signal proportional to flame detection.

The detectors perform continuous selt-testing of optical and electronic functions. Fault levels are in the 0.0-4.0 mA current output range.
Optional Alarm and Fault relay contact outputs are available.

The safety certification of the Flame detectors includes both the analog output and the relay output as safety function.

The safety function of the Flame detector does not include:

- HART communication

SAFETY MESSAGES

Procedures and instructions in this section may require special precautions to ensure the safety of personnel performing the operations. Information that raises potential safety issues is indicated by the word “Warning”. Always read and understand these safety messages.

INSTALLATION

The Flame Detectors are intended for use in hazardous environments that may include explosive levels of flammable compounds.
This product must be properly installed, operated and maintained. Improper installation or use could result in an explosion or fire resulting in death or serious injury.

Warning

- Do not open when energized.
- Detector must be properly installed, wall mounting part and transmitter housing must be fully engaged and screws tightened to meet hazardous area explosion-proof requirements.

NOTE

The detector is not safety-rated during detector warm-up and maintenance. Alternative means should be used at the jobsite to ensure facility safety during these activities.

COMMON MISUSE SCENARIOS

Refer to the Installation, Commissioning and Maintenance sections of the operating manual for information on avoidance and resolution of common misuse scenarios.
No special application restrictions are necessary to meet the safety certification requirements.

MAINTENANCE

Flame detector requires additional testing to be performed.

Visual Field inspection test

Maintenance of flame detectors mainly relates to keeping the optical surfaces clean (window and reflector inside surface). In most installations a periodic cleaning is required.
Clean the detector window and the test reflectors, using a soft cloth soaked in a 50/50 mixture of Ethanol and water.

Flame response test

In order to perform function test of the detector, a test flame can be carried out, this should result in a 4-20mA analog output change which can be observed at the control system.
This is a simple test to verify the main function of the detector.

Make sure that the elements connected to the detector (control system, fire panel or other extinguishing equipment) are under control, in order to avoid nuisance alarms.

4-20 mA and relay outputs response test

Testing the safety functions can be made through two alternatives:

Alternative 1:

1. Inhibit alarm response at the control device.
2. Perform a full loop test by exposing the detector to a flame.
3. Re-activate alarm response at the control device.

Alternative 2:

1. Inhibit alarm response at the control device.
2. Force the detector outputs manually using the TLU600 remote or HART handheld communicator in order to test the analog and the relay outputs.
3. Use the LT15 test lamp and its associated menu in order to test the detection part and observe the LEDs of the cartridge.
4. Re-activate alarm response at the control device.

SPECIFICATIONS

Table 1 and Table 2 list specifications for the Flame Detectors. For a complete list of specifications, please refer to the operating manual.

	DF-TV7-T & DF-TV7-V
Operating Manual	NOSP17662
Operating Temperature Range	-40°C to +65°C
Humidity Range	95% RH uncondensed
Input Voltage	18 to 35 VDC

Table 1 – Environmental/Electrical Specifications

Status	Output
Line fault	0.0 mA
Detector faults (electronic or measure)	1.5 mA
Inhibition modes (free or fixed)	1.5 mA
Optical self-test fault	1.5 mA [1]
Operation, No faults, No Alarm	4.0 mA
IR detection	8.0 mA [2]
UV detection	12.0 mA [2]
Pre-alarm	16.0 mA [2]
Alarm	20.0 mA

Table 2 – Analogue Output Specifications

The monitoring device must be programmed to indicate a fault or overscale condition when current levels reach undercurrent (< 4mA) or overcurrent (> 20mA).

[1] Configurable with HART or TLU600

[2] The standard detector alarm output is either No alarm = 4mA or Confirmed alarm = 20mA. Pre-alarm states (8 / 12/ 16 mA) are available when the detector is in “expertise mode”.

RELIABILITY DATA

Detector	Field device	Analog output as safety function	Relay output as safety function
DF-TV7-T	MTBF	638 434 hours	651 831 hours
	MTTR	1440 minutes	
	Periodic testing interval	12 months	
	λ	1566.3	1534.1
	DC	99.0%	90.9%
	λdu	1.23*10-8	1.16*10-7
	SFF	99.2%	92.5%
	PFH	1.23*10-8 /hour	1.16*10-7 /hour
	PFD	8.41*10-5	5.39*10-4
	SIL level	SIL2	SIL2
DF-TV7-V	MTBF	242 375 hours	244 281 hours
	MTTR	1440 minutes	
	Periodic testing interval	12 months	
	λ	4125.8	4093.6
	DC	99.6%	97.0%
	λdu	1.44*10-8	1.18*10-7
	SFF	99.6%	97.1%
	PFH	1.44*10-8 /hour	1.18*10-7 /hour
	PFD	1.56*10-4	6.10*10-4
	SIL level	SIL2	SIL2

Table 3 – SIL Parameters for DF-TV7-T and DF-TV7-V