

Power supply unit



TFPS-5					
Additional addressable power supply detection for fire detection and signalling systems for buildings. Rated supply voltage 230V AC. Rated output data: rated voltage 28V DC maximum current 5A. The group provides 3 independent, protected outputs for powering external users. Each output delivers a current of up to 1.1A. Battery test and release automatic functions for deep discharge. Front control panel with 6 LEDs which report the functional state. Fault signalling output: relay in exchange. Buffer battery housing: 2 (12V-17Ah). Full RSC® management of the device: programming, remote management and control of all functional parameters. Line separator with dual insulator. Connection on LOOP. Proprietary high speed communication protocol FIRE-SPEED. Operating temperature: -5° C +40° C. Degree of protection IP30. Metallic enclosure. Dimensions (L x H x P) 320 x 365 x 170mm. Black. EN 54-4:1997 + A1:2002 + A2:2006 - EN 54-17:2005. Certificate of homologation 0051 CPR – 0432					
					Item no. TF5TFPS5

OBLIGATIONS AND NOTICES

Power supply TFPS-5, can be used in either standalone or system mode. The system mode requires the connection of the group to a detection loop of the Tecnofire control units: TFA1-298, TFA2-596, TFA4-1192. During design and installation, it is necessary to observe and apply the applicable regulations.

COMPOSITION OF THE POWER SUPPLY UNIT

The power supply unit consists of a main power supply section (PS power supply) and a secondary power supply (SD buffer batteries).
 The main power supply consists of a flyback modular switching power supply, capable of providing 5A 28V continuous current.
 The secondary power supply consists of 2 12V 17Ah batteries connected in series with each other. It is imperative that the batteries are always 2.
 Never use batteries with different manufacturers, capacity and/or production periods. The use of batteries with capacity lower than 17Ah reduces the hours of battery life of the group and distorts the internal resistance measurements causing possible improper reporting of fault.

The battery charging voltage is automatically offset according to the temperature measured by the probe that controls the temperature of the batteries.
 The power supply unit can only be installed indoors, protected from the inclemency of the weather.
 The climatic conditions of use do not require control of temperature and humidity.

All the components of the power supply unit were selected for the intended purposes. Their specifications are ensured when the environmental conditions outside the case correspond to those specified for the class 3K5 of standard EN 60721-3-3: 1995.

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STANDALONE USE MODE

The group can be used as standalone power unit independent from the loop. This mode does not provide for the connection of the device to the loop, so there is no need to set the ID address.

In this mode of operation the group has no data interchange with the system, therefore all the information related to its operation are displayed only locally by LEDs on the front panel.

SYSTEM USE MODE

The system use mode provides for the connection of the group to a detection loop, therefore it is necessary to set its ID address. In this mode, the system monitors and controls all the functional information of the group. The information on its operation is also displayed locally by LEDs on the front panel.

LOGIC UNITS

The additional power supply unit consists of a physical/logical functional unit.

ADDRESSING

The physical address which identifies the additional power supply unit is set using two decimal rotary switches located inside the housing, on the cable fastening motherboard.

The two switches enable to set the two digits which make up the physical address number. The switches are marked by writings which define the position of the digit to set: X10 for tens and X1 for units.

The numeric range of the allowed addresses for the power supply unit is 01 to 99.

Note: setting the address 00 excludes the power supply unit from operation, yet it draws power from the loop.

Note: although excluded from the general operation of the system, the group is able to provide all the available current.

LINE SPLITTER

The power supply unit is provided with a line splitter with dual breaker. In case of short circuit of the Loop line, the splitter trips, switching off the faulty section of the line, safeguarding the correct operation of the devices connected upstream and downstream.

The trip of the splitter ensures the correct operation of the power supply unit. At the same time the detection unit is sent the faulty notice "Splitter open".

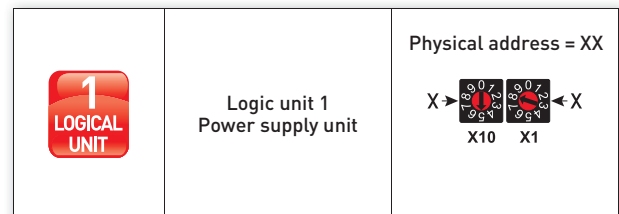
DIAGNOSTIC FUNCTIONS

The control unit manages a set of diagnostic functions specialized for the different types of module.

The diagnostic functions that are available for the power supply module allow to:

- Physically identify the module.
- Identify the type of module, the HW and FW version.
- Measure the electric data of operation.
- Read the statistics from the communication monitor

	Standalone use mode	System use mode
Connection to the loop	No	Yes
Address programming	No	Yes
System reports	No	Yes
Local reports	Yes	Yes

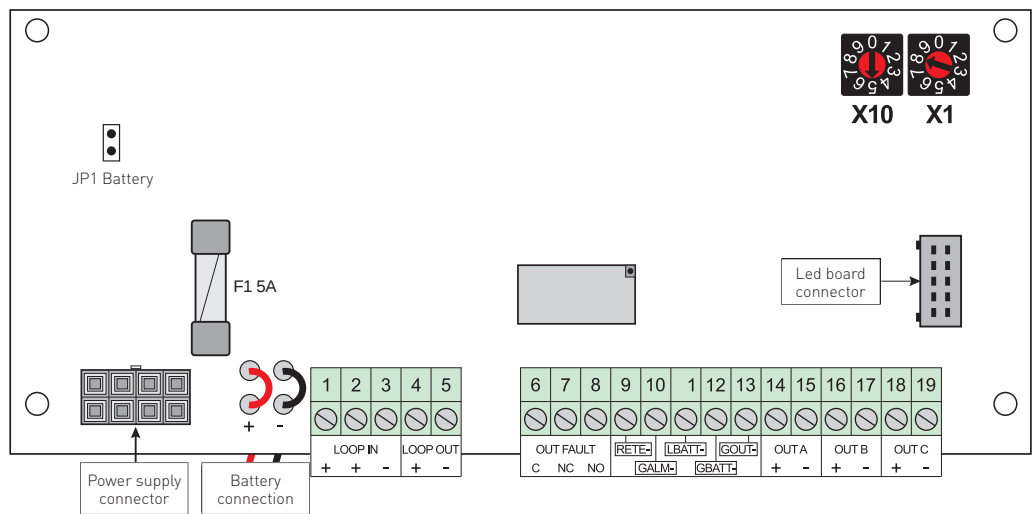


Power supply module diagnostics functions	
Identification	Turns off the Leds of the device for its identification
Self declaration	Self declaration of the module type
Hardware version	Self declaration of the hardware version
Firmware version	Self declaration of the firmware version
Level measurement	Measurement of the electric values of operation
Statistics	Statistic/functional values related to communication

Draw	Frames sent
Supply level	Errors
Zero level	Success Rate
Draw level	Error rate
Line resistance	Latency time

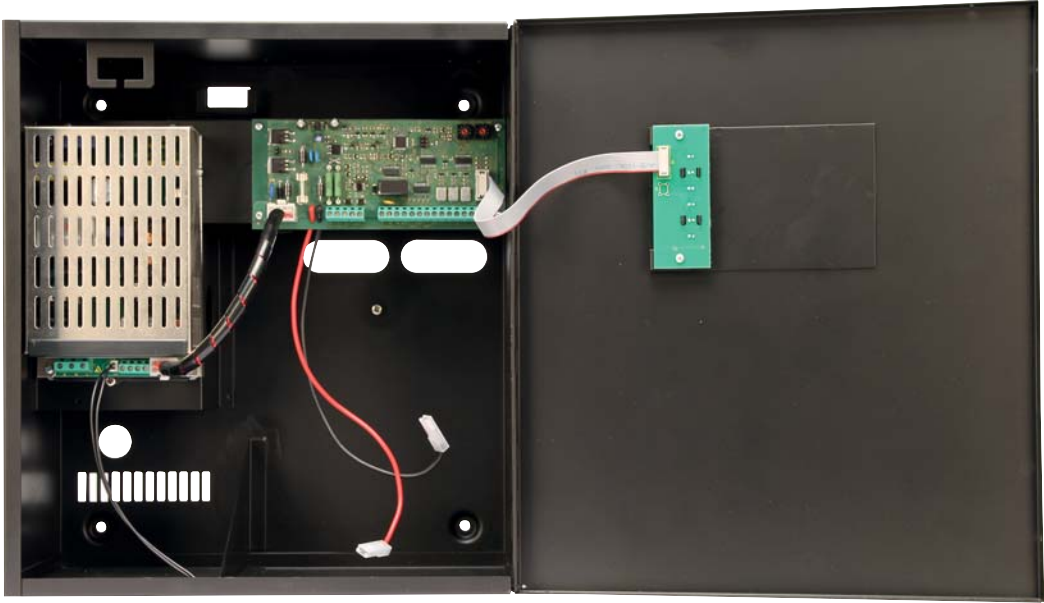
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CARD AND TERMINAL BOX TOPOLOGY



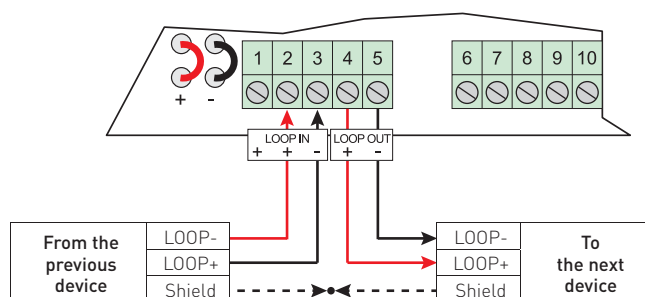
1 2 3 4 5 LOOP IN LOOP OUT + + - + -					6 7 8 9 10 11 12 13 14 15 16 17 18 19 OUT FAULT RETES LBATT- GOUT- OUTA OUTB OUTC C NC NO GALM- GBATT- + - + - + -													
1	LOOP IN	Input + (no breaker)			6	OUT FAULT	General fault relay output			C (common contact)								
2		Input +			7		Potential free contacts			NC (normally closed)*								
3		Input -			8					NO (normally open)*								
4	LOOP OUT	Output +			9	GRID-				Mains fault								
5		Output -			10	GALM-	Open collector signalling outputs.			Power supply fault								
					11	LBATT-	Negative signalling I max 100mA			Low battery fault								
F1	Protection fuse against battery polarity reversal		5A 250V FAST 5x20 LBC		12	GBATT-				Battery fault								
					13	GOUT-				Overload fault								
JP1	Battery - Battery automatic release				14	OUT A				+27.6V								
	Open	Battery automatic release when the voltage drops below 18V			15					Negative								
							16	OUT B	Power supply outputs for 27.6 V DC users			+27.6V						
	Closed	The battery automatic release function is disabled			17				Negative									
						18	OUT C				+27.6V							
					19				Negative									

* Refers to unpowered condition, status is reversed in the presence of power supply



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CONNECTION TO THE LOOP

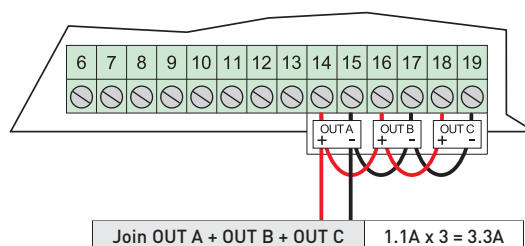
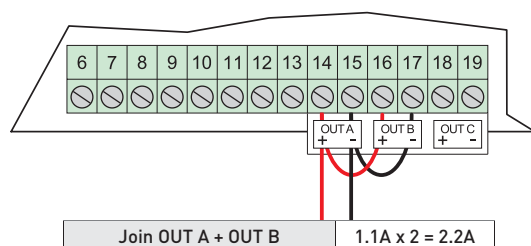


POWER SUPPLY OUTPUTS

The module has three independent power supply outputs. Each output is protected against short-circuit and overvoltage.

The output current is limited to 1.1A guaranteed at $27.6V \pm 1.5\%$ at an ambient temperature of 23°C .

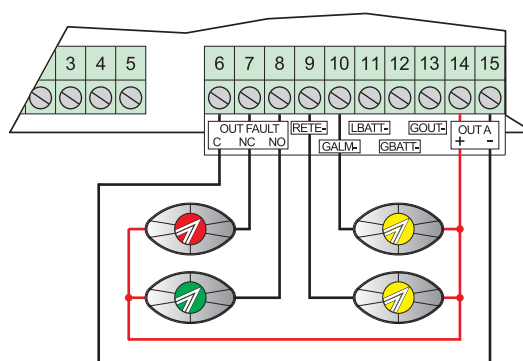
If you need to supply loads that require a current greater than the threshold value, it is possible to increase the power output by combining two or three power outputs.



SIGNALLING OUTPUTS

The power supply unit has 5 outputs with electric signalling, the outputs are negative open-collectors. In the idle state the output features high impedance, in the state of signalling, the potential of the output is negative. The electrical outputs can deliver a maximum current of 100mA, so they can drive low draw relays or optical relays. The group has a free exchange relay general fault output "FAULT", PTC protected 650mA maximum current.

The "FAULT" output is the OR of all the electrical outputs, and therefore follows the switching status of any electrical output. The outputs are not subject to any timing, therefore they keep signalling until the fault condition persists. In the rest state of the "FAULT" output, the relay is energized, in the signalling state, the relay is deenergized.

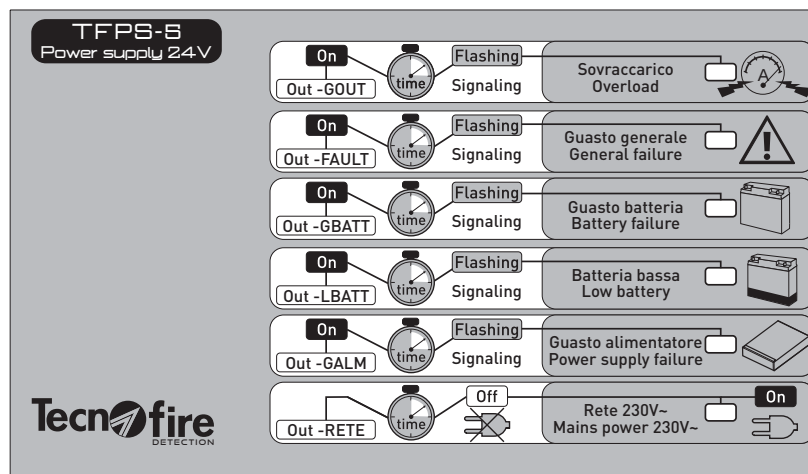


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LOCAL REPORTS

The LEDs on the front panel display locally the operating states of the group. In the system use mode, information is also transmitted to the control unit. The power supply group shall constantly submit its

LOCAL REPORTS components to functional tests implemented at predetermined frequencies. Under the conditions of normal operation, that is in total absence of faults, only the green LED "MAINS 230V~" is on.



Type and frequency of tests	No fault condition	Onset of the fault	Detection time	Verified fault Activates the outputs, turns on the LEDs	Signals	Reference table
Output overload 125 mseconds	Sovraccarico Overload	Flash	10 sec.	Out -GOUT On	Out -FAULT On	01
Battery presence 10 sec.	Batteria bassa Low battery	Flash	5 min.	Out -GBATT On	Out -FAULT On	02
Battery resistance 30 min.			2 hours			03
Battery charge level 10 sec.	Batteria bassa Low battery	Flash	15 min.	Out -LBATT On	Out -FAULT On	04
Battery charger PSU 1 sec.	Guasto alimentatore Power supply failure	Flash	5 min.	Out -GALM On	Out -FAULT On	05
Overvoltage PSU 1 sec.			60 sec.			06
Mains ON 1 sec.	Rete 230V~ Mains power 230V~	On	Only programmable from the control unit 0 to 30 min Factory setting 30 min	Out -RETE On	Out -FAULT On	07 - 08

Fault messages managed	Mandatory alerts EN 54-4	Reference table
Overload of power outlets		01
Loss of secondary power source (battery)	Mandatory alert in accordance with EN 54-4	02
High internal resistance of the battery	Mandatory alert in accordance with EN 54-4	03
Low battery without mains		04
Power supply loss of the battery charger	Mandatory alert in accordance with EN 54-4	05
Power surge		06
Loss of main power source (230V)	Mandatory alert in accordance with EN 54-4	07
Battery drained without mains		08

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Table 01	Overload of power outlets
The test is performed on each power supply output every 125 msec. The test verifies the condition of overload, if the overload persists for a time greater than 10 seconds the fault message is issued.	
Test frequency	125 mseconds
Fault generation	10 seconds (detection time necessary for the generation of the fault)
Actions generated on the onset of the fault	The "OVERLOAD" LED flashes
Actions generated by the fault	Reporting to the control unit of the "OVERLOAD" event
	The "OVERLOAD" LED turns on steadily
	The electric output "GOUT" activates
	The "GENERAL FAILURE" LED starts flashing
	The relay output "FAULT" activates
Fault reset conditions	Fault alerts are reset after detecting, for at least 30 seconds, the recovery of normal operating conditions.

Table 02	Loss of secondary power source (battery)
The test is performed every 10 seconds, on each battery. The test verifies if the battery voltage without load is below 10V. If for 5 minutes the detected voltage is below the preset reporting threshold (which cannot be changed), a fault is reported.	
Test frequency	10 seconds
Fault generation	5 minutes (detection time necessary for the generation of the fault)
Actions generated on the onset of the fault	The "BATTERY FAILURE" LED flashes
Actions generated by the fault	Reporting to the control unit of the "BATTERY FAILURE" event
	The "BATTERY FAILURE" LED turns on steadily
	The electric output "GBATT" activates
	The "GENERAL FAILURE" LED starts flashing
	The relay output "FAULT" activates
Fault reset conditions	Fault alerts are reset after detecting, for at least 30 seconds, that the battery voltage without load is greater than 10V.

Table 03	High internal resistance of the battery
The test is performed every 30 minutes, on each battery. To calculate the internal resistance of the battery, the voltage is measured with and without load. If the resistance exceeds the set alert threshold (which cannot be changed), a fault is reported.	
Test frequency	30 minutes
Fault generation	2 hours (detection time necessary for the generation of the fault)
Actions generated on the onset of the fault	The "BATTERY FAILURE" LED flashes
Actions generated by the fault	Reporting to the control unit of the "BATTERY FAILURE" event
	The "BATTERY FAILURE" LED turns on steadily
	The electric output "GBATT" activates
	The "GENERAL FAILURE" LED starts flashing
	The relay output "FAULT" activates
Fault reset conditions	Fault alerts are reset after detecting, for at least 30 seconds, that the value of the internal resistance of the battery is lower than the threshold value.

Table 04	Low battery without mains
The test is carried out only when there is no mains voltage, with a frequency of one test every 1 second, the fault is generated when the test detects for more than 15 minutes that the battery voltage dropped below 21.6V.	
Test frequency	1 second
Fault generation	15 minutes (detection time necessary for the generation of the fault)
Actions generated on the onset of the fault	The "LOW BATTERY" LED starts flashing
Actions generated by the fault	Reporting to the control unit of the "LOW BATTERY" event
	The "LOW BATTERY" LED turns on steadily
	The electric output "LBATT" activates
	The "GENERAL FAILURE" LED starts flashing
	The relay output "FAULT" activates
Fault reset conditions	Fault alerts are reset after detecting, for at least 30 seconds, that the battery voltage is greater than 22.8V.

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Table 05	Power supply / loss of the battery charger
The test is performed every 1 second, the fault is generated when the test detects for more than 5 minutes the presence of mains power, but does not detect the supply of the necessary current to recharge the batteries by the power supply.	
Test frequency	1 second
Fault generation	5 minutes (detection time necessary for the generation of the fault)
Actions generated on the onset of the fault	The "POWER SUPPLY FAILURE" LED starts flashing
Actions generated by the fault	Reporting to the control unit of the "POWER SUPPLY FAILURE" event
	The "POWER SUPPLY FAILURE" LED turns on steadily
	The electric output "GALM" activates
	The "GENERAL FAILURE" LED starts flashing
	The relay output "FAULT" activates
Fault reset conditions	Fault alerts are reset after having detected, for a period of 5 minutes, that the power supply provides the current needed to recharge the batteries.

Table 06	Power surge
The test is performed every 1 second, the fault is generated when the test detects that for more than 60 seconds the value of the supply voltage of the external devices exceeds 30V.	
Test frequency	1 second
Fault generation	60 seconds (detection time necessary for the generation of the fault)
Actions generated on the onset of the fault	The "POWER SUPPLY FAILURE" LED starts flashing
Actions generated by the fault	Reporting to the control unit of the "OVERVOLTAGE" event
	The "POWER SUPPLY FAILURE" LED turns on steadily
	The electric output "GALM" activates
	The "GENERAL FAILURE" LED starts flashing
	The relay output "FAULT" activates
Fault reset conditions	Fault alerts are reset after detecting, for at least 60 seconds, that the output voltage has returned to the rated value of 27.6V.

Table 07	Loss of main source (mains 230V)
The test is performed every 1 second, the fault is generated when the test detects the lack of mains power for the entire detection time set.	
Test frequency	1 second
Fault generation	Programmable from 0 to 30 minutes (detection time necessary for the generation of the fault)
Actions generated on the onset of the fault	The Led "MAINS POWER 230V~" turns off
	The "POWER SUPPLY FAILURE" LED flashes
Actions generated by the fault	Reporting to the control unit of the "POWER SUPPLY FAILURE" event
	The "POWER SUPPLY FAILURE" LED turns on steadily
	The electric output "RETE" activates
	The "GENERAL FAILURE" LED starts flashing
	The relay output "FAULT" activates
Fault reset conditions	Fault alerts are reset after having detected for a time equal to the preset detection time, that the mains voltage has been restored.
NOTE: The alert of the LED "MAINS 230V~" follows the state of mains presence immediately without any delay. The detection time can be set only from control unit or Centro program. The factory set detection time is 30 minutes.	

Table 08	Battery drained without mains
The power supply unit is provided with a self-check that prevents the total discharge of the batteries (to preserve their recovery). If the power supply has no power from mains and the battery level drops below 18 volts after a detection time of 15 minutes, the power supply unit releases the batteries and shuts down.	
Actions generated 3 minutes before power supply turn off	Reporting to the control unit of the "BATTERY FAILURE" event
	The "BATTERY FAILURE" LED turns on steadily
	The electric output "GBATT" activates
	The "GENERAL FAILURE" LED starts flashing
	The relay output "FAULT" activates

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DEDICATED ACCESSORIES

YUASA



Lead acid rechargeable battery YUASA 12 VDC 17 Ah.
Dimensions (L x H x P) 181 x 167 x 76mm.

TFBY-12 17

Item no. FT17TFBY1217

FIAMM



Lead acid rechargeable battery FIAMM 12 VDC 18 Ah.
Dimensions (L x H x P) 181 x 165.5 x 76mm.

TFBF-12 18

Item no. TF17TFBF1218

TFPS-5 - Technical and functional specifications

Overview	Device Name	TFPS-5
	Description	Power supply unit 28V DC 5A
	Communication protocol	FIRE-SPEED
	Addressing	2 rotary switches
Programming	Polling frequency	2 levels
	Transmission LED	Excludable signal
	Mains fault alert	Can be delayed
Electrical specifications of the module	Power supply	From loop
	Rated Voltage	24V DC
	Operating voltage	18V...30V DC
	Line splitter	Intelligent breaker (without loss of devices)
Power supply Power supply (ps)	Modular power supply	28V DC 5A (switching flyback)
	Supply voltage	230V AC +10% -15% 50Hz
	Maximum current requirements	700mA AC
Buffer batteries Storage device (sd)	Allocable batteries	2 x12V/17Ah (connected in series)
	Battery charge current	1.5A maximum
	Protection from reverse polarity	Fuse 5A 250V FAST 5x20 LBC
	Battery release	Automatic with tension lower than 18V
	Flammability class	V-2 or higher
	Internal resistance	1.5 Ohm
Output electrical specifications	User power supply outputs	3 independent (protected by polyswitch)
	Voltage supply outputs	27.6V DC $\pm 1.5\%$ (environment temp. 23°C)
	Max distributable current outputs	3 x1,1A a 27,6V DC
	Maximum load ripple	$\leq 150\text{mVpp}$
Physical specifications	Operating temperature	-5°C...+40°C
	Relative humidity	10%...93% (non-condensing)
	Protection degree	IP30
	Enclosure	Metal
	Dimensions (L x H x D)	320 x 365 x 170mm
	Weight	7.6Kg
Conformity	Standards	EN 54-4:1997+A1:2002+A2:2006 - EN 54-17: 2005
	Certification number	0051-CPR-0432
	Year of CE marking	14
	Declaration of performance	001_TFPS-5
	Notified body	IMQ

N.B. The declarations of conformity and performance are available on the website: www.tecnofiredetection.com