# Line Heat Detector Honeywell DTS

DTS (Distributed Temperature Sensing) System is capable of detecting fires and accurately localize fire and hotspots. The system allows to precisely measure, locate and signalize even small differences of temperature changes by measuring and highlighting temperature of a specific spot vs. environment. Fire resistant (PH rating) sensing cable is capable to transmit signals also during a fire, even when temperatures are up to 1000°C. That allows to monitor the progress of fire and supervise fire rescue action accordingly. There is a wide range of possible applications to use a Line Heat Detector DTS as shown in the table below.
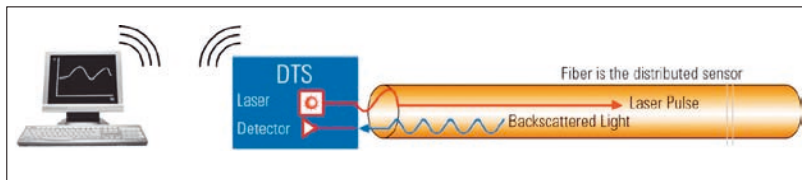
Operating principle

Application	DTS advantages
Tunnels, parking areas	DTS sensor cable resistant to exhaust fumes, dirt, moisture
Cable routes, channels	DTS sensor is able to localize and signal spots of overheating
Transformers, turbines, engines	DTS, fully EMC proof cable, able to measure temperature at threatened spots
Technical floor	DTS sensor cable is fully maintenance free, no service access needed
Mining / power plants / refineries	DTS solution certified: ATEX, VdS, SIL, FM Global, IECEx, CNBOP, UL for heavy-duty industrial applications, detecting fire/ leakage / frost / overheating
Biomass, grains, waste warehouses	DTS sensor cable resistant to heavy dust and acid environment
Belt conveyors	DTS detects and localizes worn down and overheated conveyor belt rollers

FEATURES & BENEFITS

- Temperature measurement and monitoring by fiber-optic sensor cable
- Up to 10 km sensor cable for each measurement channel
- 1, 2 or 4 measurement channels per detector
- Loop or open line sensor cable topology
- Up to 256 independent alarm zones per measurement channel

- Laser class 1M power below 20mW
- 10 seconds measurement cycles
- Spatial resolution up to 0.5 m
- Relay interface, optionally Modbus IP/RTU
- Bidirectional, full digital integration with ESSER by Honeywell fire alarm systems

Operation principles

The DTS detector equipped with a low power laser source (laser class 1M) generates measurement impulses in a fiber-optic sensing cable FRNC and analyzes frequency spectrum of returning echo. Using Raman scattering (quantum physics effect) and patented measurement technic (Optical Reflectometer Code Correlation), DTS detector indicates temperature profile up to 10 km sensor cables. Every 10-30 seconds the system determines temperature of thousands of measurement points deployed every 0.5-8 m along the sensor cable. Measurement results are statistic outcomes of many repeated measurements during the cycle.

Low power laser operating with heavy-duty, industrial-proof sensor cable ensures over 20 years of system operation time. The precise measurement system allows long-standing operation without necessity of recalibration.

1M laser class ensures high level of safety. In case of sensor cable break, system is able to continue measurement without any risk to human life and is still also able to operate in hazardous environment with explosive gas, vapors or dust.

DTS detector

Low power consumption (17 W) ensures operation inside rooms without air conditioning and long time operation on battery emergency power supply. After complete power supply loss, the detector automatically restarts itself and returns to normal operation within 30 seconds after powering on.

Both laser transmitter and receiver are thermally stabilized which ensures precise measurement over the entire operating temperature range. All optical elements are placed in air-tight containers filled with noble gas. This solution ensures protection against moisture and dust, and guarantees fault-free and long-lasting operation in heavy duty industrial environment.

DTS detector stores the most recent 120 temperature measurement traces along whole sensor cable length, which allows alarm events and system faults analysis.

Integration with fire alarm and management systems

DTS detector can operate as a standalone system. In this case the system displays alarm states, faults, locations of cable break etc. using LED indicators and LCD display on detector housing. For monitoring in the fire alarm system, DTS detector provides 44 relay outputs, optionally upgradeable to 256 outputs. DTS outputs may transmit alarm and fault states from configured alarm zones to any fire alarm system. The safest functionality and highest performance is provided though by bidirectional, fully digital integration with ESSER by Honeywell IQ8Control and FlexES Control systems via SEI2 interface into essernet network. Digital integration makes possible[1] the transmission of more than thousand zone alarms, prealarms, faults as well as disablement, test mode and reset of individual zones. Moreover to obtain best operator interface it is recommended additionally to integrate DTS directly via Ethernet network with a management software like Honeywell´s WINMAGplus.

WINMAGplus uses communication via Ethernet network (TCP/IP) with SCPI protocol, which provides all alarm states and real- time temperature measurement values from thousands of DTS measurement points.

Configuration options

The DTS detector can be equipped with 1, 2 or 4 measurement channels. It allows operation with 4 open lines or 2 loops sensor cable topology. Each channel can be configured with up to 256 alarm zones with maximum 5 individual alarm criteria for each alarm zone:
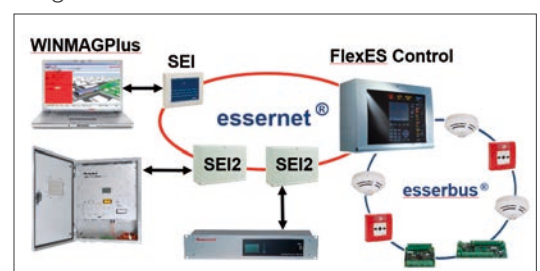
- exceeded temperature level (constant temperature threshold)
- exceeded local temperature level in regard to average temperature measured in a zone (adaptive temperature threshold)
- 3 criteria of exceeded temperature increase within certain time
- exceeded low temperature level (frost alarm)
- localization and indication of a sensor cable break (LCD display or visualization software)

Loop sensor cable topology provides redundancy of the cable – all system functions (especially temperature measurement) are preserved along the entire length of the sensor cable despite sensor cable break.
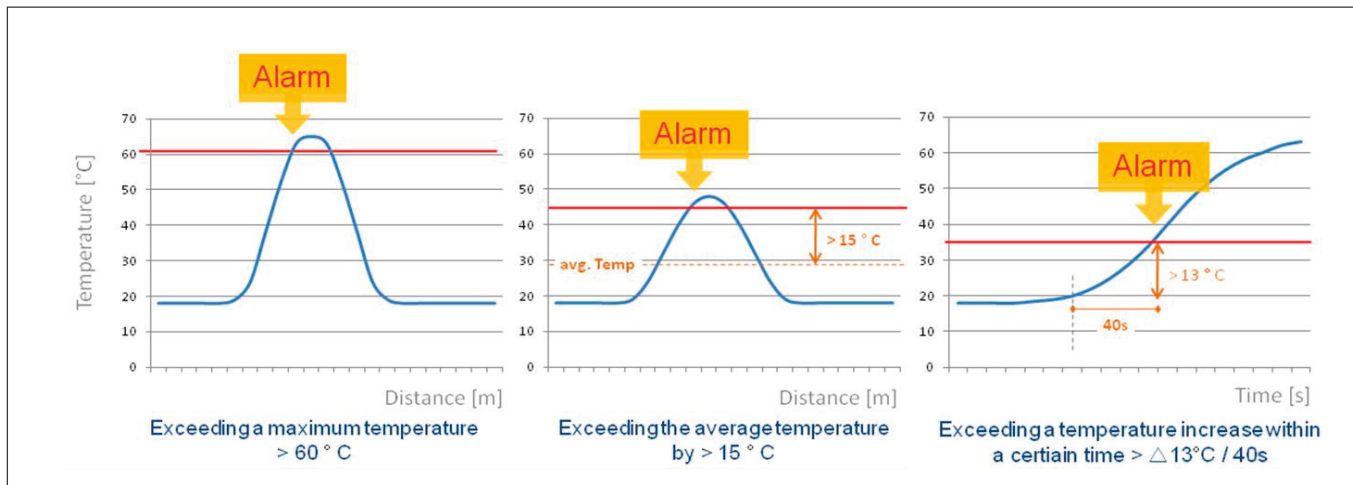
Two sensor cable types are available:
- Safety FRNC – standard without metal components
- Steel FRNC – armored with stainless steel tubes and outer sheath

Main characteristics of both cables are: small bending radius, which makes easier installation along the zones and devices monitoring possible; slim profile with minimal thermal inertia, ensuring quick heating up of the sensor cable in very early stages of the fire.

Alarm	**Alarm**	**Alarm**
Exceeding a maximum temperature > 60 ° C	Exceeding the average temperature by > 15 ° C	Exceeding a temperature increase within a certiain time > △ 13°C / 40s

TECHNICAL DATA DTS DETECTOR

Measurement distace range	1 km, 2 km, 4 km, 6 km, 8 km or 10 km
No. of measurement channels	1, 2 or 4 channels
Highest spatial resolution	0,5 m
Range of spatial resolution	0,5 – 8,0 m
Measurement cycle time	10 s or 30 s
No. of alarm zones per each channel	256
Optical connectors	E2000, 8° angled
LED indicator	operation, measurement, fault, alarm
LCD display	4 lines, 16 characters, colors for different states
Internal measurement traces memory	120 last measurement traces
Laser class (IEC 60825-1:2001)	1 M (output power 17 mW)
Dry contact relays	44, maximum load 1A/30VDC, optionally up to 256
Contact inputs	4
Communication interface	USB, LAN, optionally: RS-485, RS-422, RS-232
Communication protocol	SCPI, ASCII, optionally: MODBUS TCP, RTU
Power supply	10 to 30 V DC
Power consumption	approx. 17 W, at 20°C ambient temperature (approx. 700 mA@24 V DC)
Operating temperature of DTS detector	–10°C to +60°C
Storage temperature	–40°C to +80°C
Relative air humidity range	0% to 95%
IP rating	IP30 - 19" rack version / IP66 - wall mount version
Dimentions (WxHxD)	800 x 600 x 220 mm - wall mount version 448 x 88 x 364 mm, 2 HU - 19" rack version
Weight	17 kg - wall mount version 9 kg - 19" rack version
Certificates	VdS, UL, ATEX, FM Global, IECEx, CNBOP
Specification	EN 54-22, EN 54-13 in combination w. ESSER by Honeywell FlexES Control/IQ8Control
ATEX specification (optional)	EX II (1) DG, I M2
Heat response class acc. EN54-22	A1N, A2N, BN, CN, DN, EN

TECHNICAL DATA SENSOR CABLE

	Safety FRNC	Steel FRNC
Diameter	4,0 mm	3,8 mm
Weight	17 kg/km	25 kg/km
Crush resistance	100 N/cm	960 N/cm
Tensile resistance	1000 N (short time)	1500 N (short time)
	800 N (long time)	1100 N (long time)
Minimum bending radius	20 x diameter mm (with tension)	
	15 x diameter mm (without tension)	
Optical fiber type	2 x MM 50 / 125 μm	
Attenuation	0,9 dB / km @ 1064 nm	
Operating temperature (periodically <1h)	–50°C to + 150°C	
Operating temperature (constantly)	–40°C to + 85°C	
Installation Temperature	–50°C to + 50°C	
Operating during fire	750°C for 2 hours	

ORDER INFORMATION

	Part No.
Line heat detector Honeywell DTS – evaluation unit, distance range 1 km	970120.IN
Line heat detector Honeywell DTS – evaluation unit, distance range 2 km	970121.IN
Line heat detector Honeywell DTS – evaluation unit, distance range 4 km	970123.IN
Line heat detector Honeywell DTS – evaluation unit, distance range 6 km	970124.IN
Line heat detector Honeywell DTS – evaluation unit, distance range 8 km	970126.IN
Line heat detector Honeywell DTS – evaluation unit, distance range 10 km	970125.IN
License Modbus TCP/IP interface	970129.IN
2 sensor channels for Honeywell DTS detector	970130.IN
4 sensor channels for Honeywell DTS detector	970132.IN
ATEX, IECEx certification for Honeywell DTS detector	970133.IN
Wall mount housing IP66 for Honeywell DTS detector	970134.IN
HD I/O connection set w. connection block	970139
HD I/O connection set w. open end	970139.IN
Plastic clamp set (100 pc.) – dowels in zinc-plated steel	970140.IN
Plastic clamp set (100 pc.) – dowels in stainless steel	970142.IN
Steel clamp set (100 pc.) – dowels in zinc-plated steel	970143.IN
Anchor setting tool	970144.IN
Stainless steel clamp set (100 pc.) – dowels in stainless steel	970145.IN
Micro splice box IP20 for Honeywell DTS FO sensor cables	970146.IN
Heavy duty splice box IP67 aluminum for Honeywell DTS FO sensor cables	970147.IN
Double head cable ties PA 6.6W (500 pc.)	970148
FO sensor cable Safety FRNC for Honeywell DTS	970150.IN
2 sensor cable connectors preassembled on one end of FO sensor cable 970150.IN	970151
Sensor cable heating testing tool	970151.IN
FO sensor cable Steel FRNC for Honeywell DTS	970153.IN
2 sensor cable connectors preassembled on one end of FO sensor cable 970153.IN	970154
E2000 APC 8° pigtail, 5m	970154.IN
Management software WINMAGPlus licence for Honeywell DTS, alarms	013661
Sensor tube cutting tool	970165.IN
DTS warrants extention from 1 to 3 years	970166
DTS warrants extention from 1 to 5 years	970167

For more information please see products catalog or installation and user manuals.

Honeywell