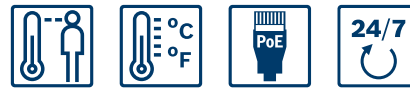# Human Skin Temperature Detection Solution

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BOSCH
Invented for life

- ▶ Calibrated thermal sensor for human skin temperature detection in indoor applications

- ▶ Temperature reference device included to compensate automatically for temperature drift

- ▶ Multiple detection modes with manual/automatic threshold configuration

- ▶ Intelligent system for live and forensic analysis of temperature

The DINION IP thermal 9000 RM camera kit is a system for contactless measurement of surface temperature at short range in indoor application scenarios. The total system includes a microbolometer-based DINION thermal camera (NBT-9000-F19QSM), a temperature reference device (IBB-5000-35), a VIDEOJET decoder 7000 (VJD-7513) with embedded thermal analytics, and a keyboard (KBD-UXF) for ease of use.

The system combines the capabilities of the camera to detect thermal temperature with the software algorithm, from Bosch, for temperature detection. The algorithm is embedded in the decoder. Quick, on-site calibration and temperature threshold setup enables the system for alarming in cases where human skin is warmer than the configured threshold.

The system derives its alarm threshold automatically from the histogram of cached temperature data, and will then update the new threshold in order to mitigate the environmental influences. The analytics combine face detection and tracing with a multi-point temperature measurement, which allows to detect the most hottest attainable temperature of a tracked person.

The system includes a temperature reference device (blackbody) that generates a stable temperature for the thermal camera to use as a reference. The camera then uses the data to compensate for possible temperature drift.

Different regions have different privacy requirements. To comply with these requirements, and to respect the privacy of the people being scanned, users can select the suitable mode where face temperature and absolute temperature information can be hidden, without reducing either the system accuracy or its effectiveness.

For complete system configuration and model numbers to purchase, see the Ordering Information section.

System overview

The system has the necessary features and functions for users to create either a stand-alone temperature measurement system or an integrated system with multiple cameras.

Stand-alone system
The total system is designed with ease of use in mind. The camera is pre-configured for indoor operation, and has an intuitive user interface via the decoder system

for local control and monitoring. Operators can access information such as temperature alarms, temperature histograms, quick video replay, and threshold configuration with a USB keyboard, without the need for an additional computer or software.

Integrated System

The system supports the following operation modes:

A. One Camera to One decoder system

This mode is most suitable for sites where a standalone system for spot monitoring is desired. The camera can be interfaced directly to the VIDEOJET decoder 7000 for local single camera display on a monitor. A maximum of two monitors can be connected to a single decoder for spot monitoring of any user-selected camera. The operator can use the keyboard interface to view local playback from decoder memory and temperature alarm.

B. Multi-camera to one decoder

This mode is suitable for buildings where multiple cameras are required and need to be monitored from one monitoring station (for example, dual entry at the building entrance). A maximum of two monitors can be connected to a single decoder for spot monitoring of any user-selected camera or for simultaneous viewing of all associated cameras. The operator can use the keyboard interface to switch between the cameras or select different views, playback from decoder memory and temperature alarm.

C. Multi-camera system distributed system

This mode is suitable for buildings where multiple cameras are required and need to be monitored from multiple stations. The system can be installed using the IP infrastructure, and cameras can be analyzed and displayed using multiple VIDEOJET decoder 7000 units. For long-term storage of video and metadata information, users can add DIVAR IP 5000 series of Bosch recorders to the system.

Functions

Temperature detection

The camera has a high-sensitivity thermal sensor which obtains long-wavelength infrared (LWIR) from target objects. LWIR lets users detect target temperature quickly, without physical contact.

Automatic face detection and tracking

The system supports automatic face detection and tracking when required in the selected profile, a face track keeps a few numbers of the hottest thermal images for closer inspection. A limited number of the most recent face tracks is stored in the face tracks history. The history can be completely anonymous, depending on the configuration, and can be erased easily.
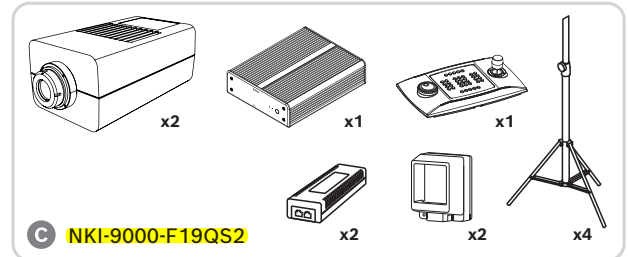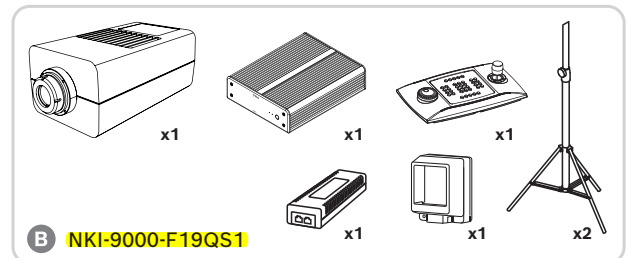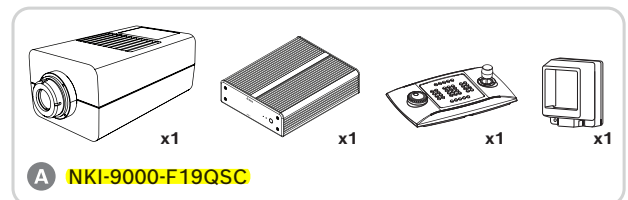
Temperature drift compensation

The system includes a blackbody device as a temperature reference. The reference device with a controlled surface temperature allows for more accurate measurement of absolute temperatures and compensates for temperature drift.
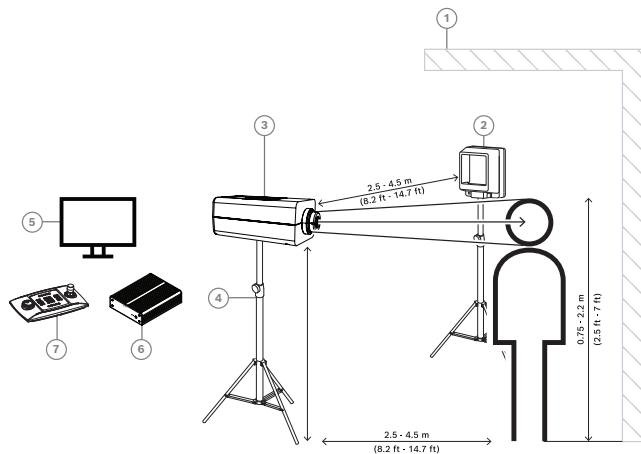
1. Do not rely on the measurement, solely or primarily, to diagnose or exclude a diagnosis of COVID-19 or any other disease.
2. Confirm an elevated body temperature, in the context of use, with secondary evaluation methods such as using a non-contact infrared thermometer (NCIT) or a clinical grade contact thermometer.

Installation/configuration notes

Kit Contents

x1   x1   x1   x1

A NKI-9000-F19QSC

x1   x1   x1
x1   x1   x2

B NKI-9000-F19QS1

x2   x1   x1
x2   x2   x4

C NKI-9000-F19QS2

Example HTD System Configuration

1 Low-reflective background
2 Temperature reference device ("blackbody")
3 DINION thermal camera
4 Adjustable tripod
5 Monitor showing view from camera
6 VIDEOJET decoder
7 Keyboard

Technical specifications

Resolution	320x240 (QVGA)
Image sensor	Focal Plane Array (FPA), un-cooled vanadium oxide microbolometer
Pixel pitch	17µm
Spectral range	8µm to 14µm
Thermal sensitivity	NETD <50mK
Frame rate	<9 fps
Lens	19 mm: F1.1
Field of view	H 16° x V 12°
Detection range	2.5 ~ 4.5m
Multiple camera support	1 - 4
Target temperature measurement range	+15 °C to +45 °C (+59 °F to +113 °F)
Temperature accuracy*	±0.3 °C (±0.5 °F) for ambient temperature +18 °C to +25 °C (+65 °F to +77 °F)
Operational temperature	+10 °C to +45 °C (+50 °F to +123 °F) (Excluding the temperature reference device)

*Definition of accuracy
The temperature accuracy applies to the displayed temperature of a second blackbody device after offset correction. The temperature reference for drift-compensation is the first blackbody (reference) device whose temperature remains at a controlled constant value.

For the offset correction, the second blackbody device is set to 37 °C (98.6 °F), and the HTD system offset is adjusted so that the corresponding displayed value is 37.0 °C (98.6 °F). Users can verify the accuracy by varying the temperature of the second blackbody device in the range 34 °C to 40 °C (93.2 °F to 104 °F), with the displayed value remaining within the specified window of the set value after the specified setting time of the second blackbody device.
In a scenario without airflow, the accuracy specification is only valid within 8 hours after offset correction, and only as long as the change in the ambient temperature is less than 3 °C (5.4 °F).

Ordering information

NKI-9000-F19QSC UNITY PKG thermal <9Hz QVGA 19mm RM C
Thermal camera, VIDEOJET decoder, USB keyboard, temperature reference device
Order number **NKI-9000-F19QSC**

NKI-9000-F19QS1 UNITY PKG thermal <9Hz QVGA 19mm RM x1
Thermal camera, VIDEOJET decoder, USB keyboard, temperature reference device, midspan, 2 tripods
Order number **NKI-9000-F19QS1**

NKI-9000-F19QS2 UNITY PKG thermal <9Hz QVGA 19mm RM x2
2 thermal cameras, VIDEOJET decoder, USB keyboard, 2 temperature reference devices, 2 midspans, 4 tripods
Order number **NKI-9000-F19QS2**

Accessories

NBT-9000-F19QSM FIXED THERMAL <9Hz QVGA 19mm Radiometric
Thermal imaging IP camera
QVGA
9 fps
19 mm lens
Order number **NBT-9000-F19QSM**

VJD-7513 High-performance H.265 UHD decoder
High-performance video decoder. H.265/H.264 up to 4K UHD and MP; MPEG-4; audio; up to 60fps per stream; HDMI and DisplayPort monitor outputs.
Order number **VJD-7513**

EWE-VJHPD-IW 12mths wrty ext. Videojet h. perf. dec
12 months warranty extension
Order number **EWE-VJHPD-IW**

KBD-UXF Keyboard, USB CCTV-oriented
USB CCTV-oriented keyboard for use with BVMS, BIS - Video Engine, or DIVAR IP systems.
Order number **KBD-UXF**

EWE-KBDUXF-IW 12mths wrty ext Intuikey Universal XF
12 months warranty extension
Order number **EWE-KBDUXF-IW**

UML-245-90 23.8 inch FHD LED monitor
23.8 inch FHD (1920 x 1080) LED monitor
Order number **UML-245-90**

NPD-5001-POE Midspan, 15W, single port, AC in
Power-over-Ethernet midspan injector for use with PoE enabled cameras; 15.4 W, 1-port
Weight: 200 g (0.44 lb)
Order number **NPD-5001-POE**

IBB-5000-35 TEMPERATURE REFERENCE DEVICE 3" 35°C
3-inch temperature reference device calibrated at 35 °C.
Order number **IBB-5000-35**

0601096A00 Tripod BT 250 Professional 1/4"
1/4-inch professional tripod for fixed cameras.
Order number **0601096A00**