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Workswell ThermoInspector

Second Generation

- Complete Thermovision Package
- Alarm Outputs and Trigger Inputs
- Multiple Camera Connectivity
- Full-screen visualization, graphs and logs
- PLC and Control System Protocols

Datasheet

Release date: 5th of June 2016

End users Validity date: 31st of December 2016 or till next revision

Revision Number: 2.2

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Workswell ThermoInspector Package

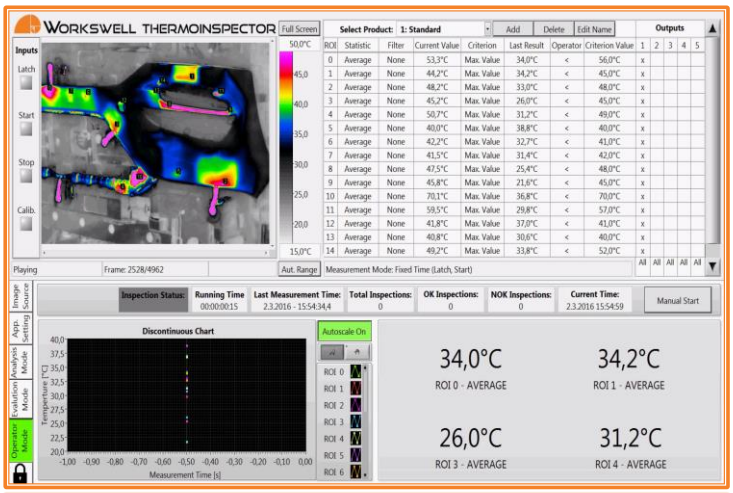
Introduction

Workswell ThermoInspector is automatic **inspection system for thermal monitoring, analysing and evaluation. It can be used for all welding, heating, cooling, soldering and other thermal processes in plastic, metal, biological, chemical and another manufacturing industry.** The ThermoInspector can measure, record and evaluate thermal information in real time and cooperate with existing machine control systems and PLCs.

ThermoInspector system consists a Central Controller unit that supports **up to 4 thermal cameras**. All infrared cameras use highly sensitive infrared sensors (better than 0.03°C) and measure within a temperature range of up to +2000°C. Due to these extraordinary properties, it can continuously measure and evaluate thermal fields on the measured product surface whether it is plastic, metal or biological material.

The system can consequently check the thermal characteristics such as thermal gradients, maximum or minimum temperature as well as evaluate the dispersion of the temperature along the thermal cut, check the speed of the increasing temperature in the selected area.

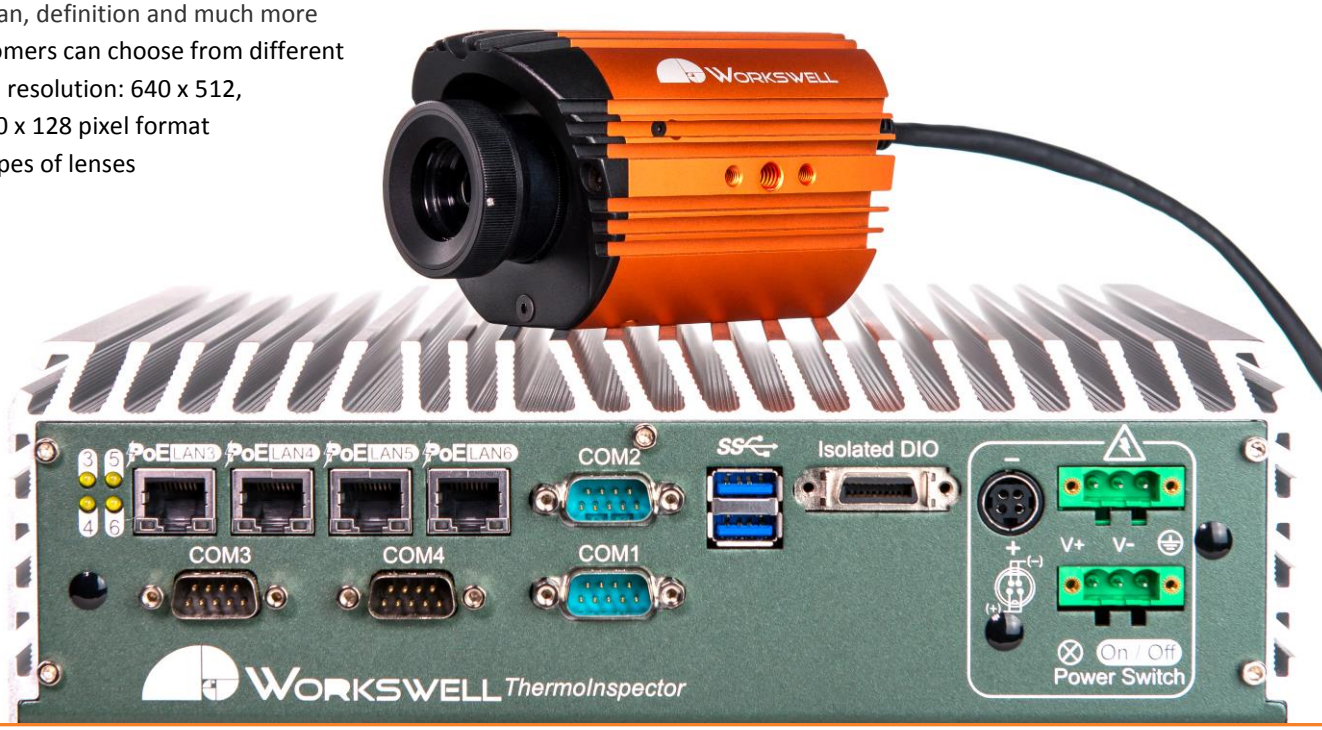
Each ThermoInspector system supports multi camera radiometric streaming, camera control, palette settings, temperature span, definition and much more functions. Customers can choose from different types of camera resolution: 640 x 512, 336 x 256 or 160 x 128 pixel format and different types of lenses



Workswell ThermoInspector

Key Features

- Complete machine infrared vision package
- LWIR 640 px, 336 px or 160 px resolution
- Plug and Play installation and easy setup
- Powerful full-screen operator visualization
- Graphs, tables, OK/NOK indicators and stats
- 8x digital inputs and outputs, 4x Ethernet ports
- Power over Ethernet cabling and 24VDC supply
- High IP65 camera and touchscreen protection
- Temperature range up to 550°C (Optional up to 2000°C)



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Two Different Powerful Central Units

Touch the heat...

- Industrial All-in-One Solution
- Front panel IP65 protection
- Fast and easy installation
- VESA interface available
- Full HD touchscreen LCD
- 4 PoE Ethernet ports
- Alarm digital outputs
- Isolated Input triggers
- 24VDC supply input
- 2 more Ethernet for PLC
- Serial communication

Workswell ThermoInspector

...or use the small and passive form-factor controller

Save dimension as well as cost with central passive controller version. The ThermoInspector passive central controller use the same performance and interfacing as Touchscreen type. Integrator can use own Full HD LCD with keyboard for system configuration.

With only 26 x 22 x 8 cm is passive controller the smallest multi-camera thermal monitoring system worldwide.

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Connect, measure and Control the Machine

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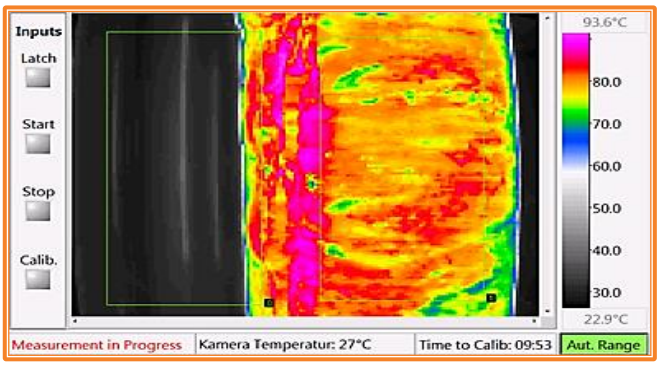
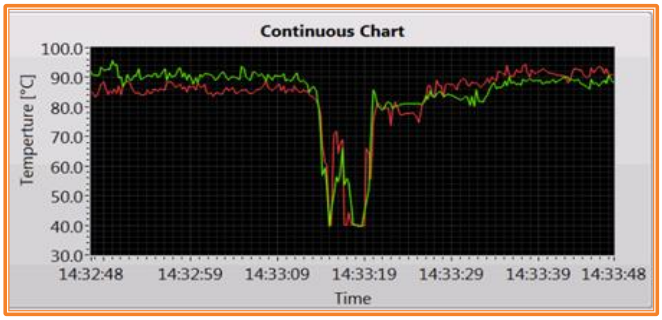
Real-time Image

Workswell ThermoInspector automatically detects all infrared cameras. Customer can setup different types of color palettes, isotherms, manual temperature span or change camera temperature range. Intuitive graphical interface check user configuration and system integrity. **Operator can place different types of measurement tools** (line, point, rectangular, circle, etc.) and check real-time data streaming and values.



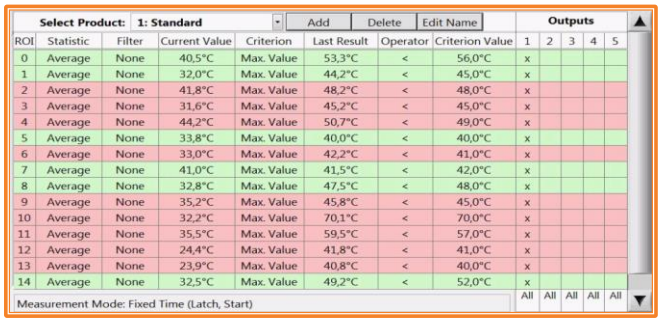
Graphical evaluation

Workswell ThermoInspector system can display during inspection processes **all necessary data and information that are needed directly on the screen**. From real-time radiometric streaming (up to 4 cameras) including set analysis for each ROI (area of interest) to time charts, temperature profiles and numerical indicators that inform an operator.



Alarm and Rule settings

In manufacturing processes, an operator must be able to set different analysis to cover various industrial applications. The ThermoInspector offers many measurement tools with local settable emissivity and also, the operator can define statistical markers such as Maximum, Minimum, Average, Deviation and Median etc. When the set condition is broken, the system displays alarm and send digital output to PLC.



Due to user-friendly and configurable environment, the ThermoInspector can be in operation within short time. The ThermoInspector system contains hundreds of prepared features for using in any kind of application; due to this fact integrator doesn't need to program any additional algorithms.

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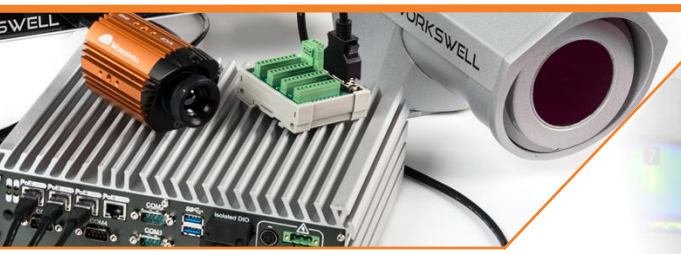
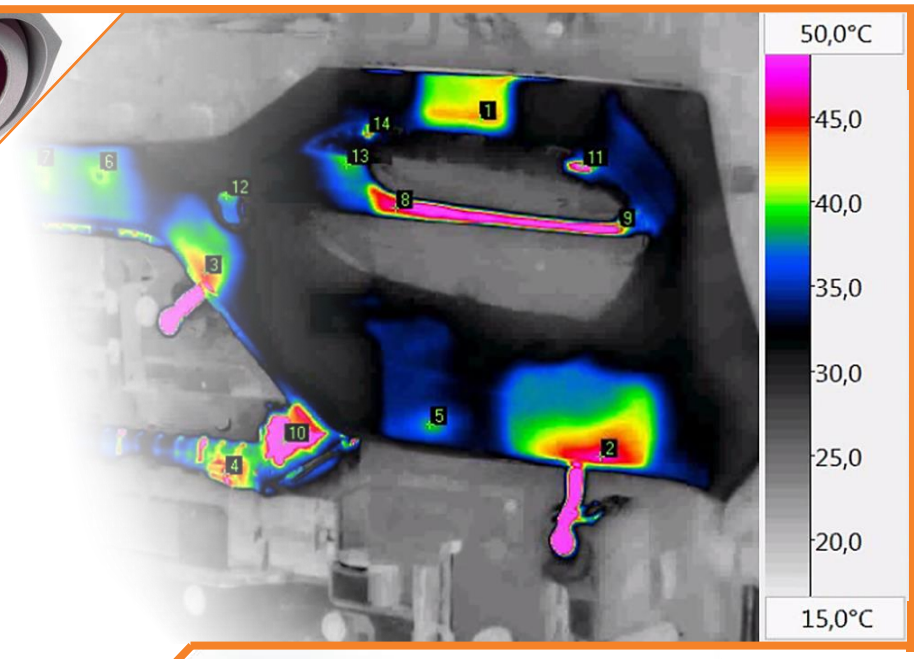
Workswell ThermoInspector Applications





Automotive Industry

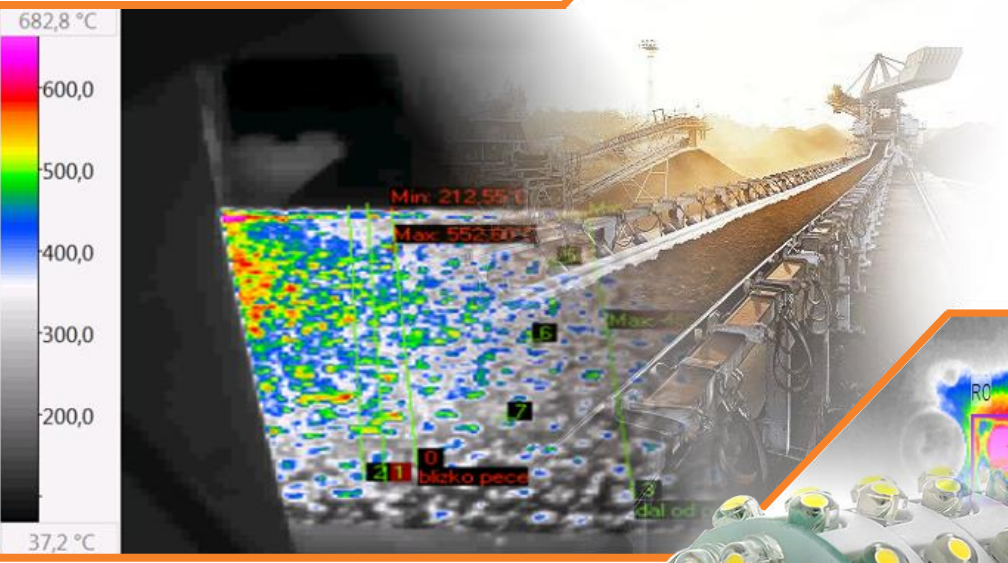
ThermoInspector helps well-known companies monitor and control quality in serial production:

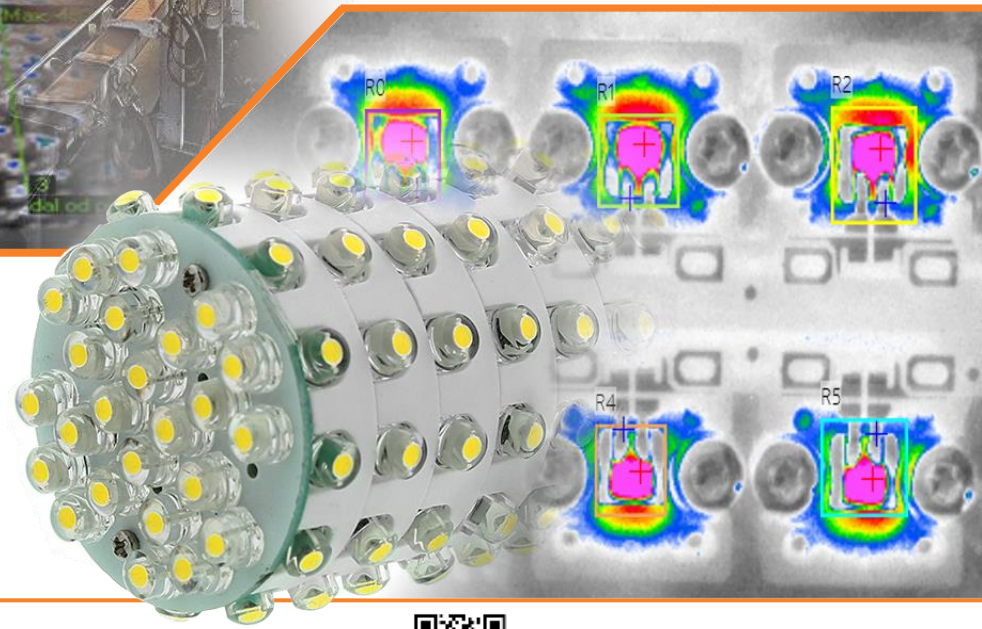
- Plastic molding injection manufacturing
- Flame jet stability before robotic painting
- Critical temperature during laser welding
- Whole components during final testing
- Cutting and pressure tool overheating
- Material cooling and preheating
- Aluminum induction soldering
- Metal brazing and sintering
- Bonding, gluing or foaming
- and much more…

Safety and Fire Protection

ThermoInspector solution can cover simple one-camera projects as well as comprehensive multi-camera applications:

- Tower and warehouse protection
- Material storage system control
- Waste and coal conveyers
- Waste and coal bunkers
- Perimeter monitoring
- Agricultural landfilling
- Ladle integrity control
- Critical slag detection





Other Industries

ThermoInspector is used in many other industries:

- Food and packaging industry
- Construction and metal industry
- Paper, textile and wood industry
- Chemical, glass and electronic industry

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Workswell ThermoInspector Specification

System overview	
Central controller units	2 possible versions: Passive central controller or Touchscreen central controller Camera ports: 4 x Gigabit PoE Ethernet, 2 x Gigabit Ethernet for PLC Digital Inputs: 8 x isolated (24 VDC compatible) inputs Digital Outputs: 8 x open collector outputs Serial ports: RS232, RS485 Power supply: 6-36VDC USB ports: 2 x USB3 super speed ports for data uploading Embedded operating system optimized for multi-camera connection
Thermal cameras	Up to 4 connected LWIR cameras per one central unit, 3 different available resolutions: 640 x 512 pixels, 336 x 256 pixels, 160 x 128 pixels with 5 different infrared lens with manual focus system Lenses: Interchangeable and focusable, various field of view Framerate up to 30Hz Temperature range: -25°C to +150°C, -40°C °C to +550°C, optional up to 2000°C Accuracy: ±2% or ±2°C Temperature sensitivity: ≤0.03°C (30mK) @ 30°C
Calibration	Yes, every delivered camera or on field calibration wizard available
Cables and adapters	Digital input and output cable with terminal block for easy DIN rail mounting Ethernet cable for every delivered camera Optional power supply adapter for 230VAC
Content of delivery	TIxx package: Touchscreen Panel Controller or Passive Controller (IR Software included, LCD, 4 PoE ports, isolated DIO, SW, 6-36VDC), IR camera (160x128px, up to 550°C, no lens, <30Hz, PoE), Cables (DIO 1m, UTP 10m, DIO board)
Power supply	
Controller Supply Input	6-36VDC or 230VAC (with optional adapter)
Camera Supply Input	Integrated in every Central Controller unit, Power over Ethernet supplying
Power Dissipation	150 W (Touch-screen controller version) 120 W (Passive controller version)
Mechanical and environmental information	
Passive controller version	260 x 215 x 79 mm
Touchscreen controller version	22 inch panel, 538 x 329 x 53 mm
Camera dimension	106 x 65 x 63 mm for IP40 for WFOV, 179 x 65 x 63 mm for IP65 for WFOV,
Weight	3kg for passive controller version 5.8kg for touchscreen controller version 360 g for every Thermal camera (without back IP65 cover)
Mounting	4 x M4 screws (Passive controller version) VESA interface 75mm and 100mm (Touchscreen controller version) 4 x 1/4-20 UNC thread and 10 x M4 (for every camera)
Internal Protection	IP 65 for thermal camera with plugin special back cover (IP 40 without) IP65 front panel of Touchscreen controller version IP40 for all passive controller version and another electronics

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Workswell ThermoInspector Specification

Thermal Camera Settings	
Source of image	**Fully radiometric streaming** for every thermal camera. User can use different cameras with different resolutions for same central controller in multi-camera configuration. Cameras can use variable speed from **1Hz to 30Hz, temperature range and trigger settings.** System measures current FPS, camera body temperature and communication stability.
Radiometry	Emissivity, windows transmission, Humidity, reflected temperature, athmosperic temperature and distance correction. Image can be rotated every 90 degrees.
Calibration	Each camera is supplied with special calibration file saved in ThermoInspector system. User can also set on-field 3point camera calibration.
Non Uniformity Correction (NUC)	Fully controllable to avoid image interruption during the measurement and control time
Units and zoom	Temperature can be displayed and calculated in **°C or °F** or in RAW data format. Every single camera can be zoomed in specific way.
Palettes and Isotherms	User can choose from **14 palettes** – BlackRed, BlueRed, BWRGB, Fire, FLIR Iron, Gradient, Gray, Iron1, Natural, Rainbow, Sepia, Steps, Temperature, WBRGB. There are also several types of temperature isotherms (above, bellow, between) available.
Graphical environment and operator vizualization	
Measurement tools	ThermoInspector contains 6 measurement tools (Point, Rectangular, Elipse, Line, etc) with local selectable emissivity. User can define statistical markers such as Maximum, minimum, average, Deviation, Median.
Administration	User can set administrator password for system locking to avoid nepovolany vstup
Language	English, German, Polish and Czech. Other languages on request available.
Graphs and Values	Continuous or discontinuous time charts, temperature profiles and numerical indicators
Background features	Automatic Start-up System initiation, TCP/IP data sharing, Ethernet IP data protocol.
History and logs	ThermoInspector can save criterion tables, measurement results, images and graphs.
Full-screen mode	User can switch between standard machine vision (Image, table and graph) visualization to the full screen multi image (Matrix) visualization
Measurement and control modes	
Triggers and alarms	Independent triggers (camera selectable) – falling, rising edge or latch, Up to 5 alarm outputs
Evaluation modes	There are several types of evaluation modes. The most common applications use one time triggered measurement and afterwards evaluation. ThermoInspector can measure single shot image or sequence. For all 24h/7d applications you can use Non-trigger mode. If you need check temperatures between Start and Stop time, ThermoInspector integrates latch mode.
Product selector	ThermoInspector integrates powerful feature that offer possibility to select different ROI (measurement tool) in specific time. It brings flexibility to use only one monitoring system for various products on single machine. Just send the product number to be measured and ThermoInspector will change ROI positions and criterion levels during the control process.

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