INDUSTRY 4.0

SMART SOLUTIONS

IRSX Series

IR Smart Camera

INDUSTRIAL USE

The First Truly Smart Infrared Camera
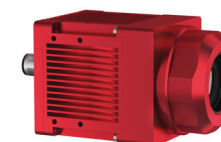
✔ **Easy access to the world of temperature imaging**
Create your individual application solution within minutes on the graphical web-frontend of the camera. No programming is required.

✔ **Industrial protocols for direct communication with your process control**
Outstanding functionality for the practical implementation of Industry 4.0.

✔ **App concept**
Change the functionality of your camera just by loading the appropriate App

✔ **Job concept**
Perform different measurement tasks by automatically switching between multiple jobs (measurement configurations)

✔ **Perfect design for industrial use, developed from the worlds pioneer in thermal imaging solutions**
Extended operating temperature range from -20°C to 60°C

✔ **Rugged IP67 housing** with integrated air purge for installation without protective enclosure

✔ **Maximum long-term reliability**

INDUSTRY 4.0
SMART SOLUTIONS

Modbus   GigE VISION   OPC UA   MQTT   REST API   Lua

IRSX-I KEY FACTS
By Professionals for Professionals

Easy Integration

✔ Stand-alone operation without a computer or external interfaces

✔ No special software required for visualization and parameterization

✔ Individual design/implementation of your measurement task with the extensive tool palette of the SmartProcessingApp

✔ Reduced system complexity, installation effort and costs

Exceptional User-Friendliness

✔ Web front-end for configuration and visualisation

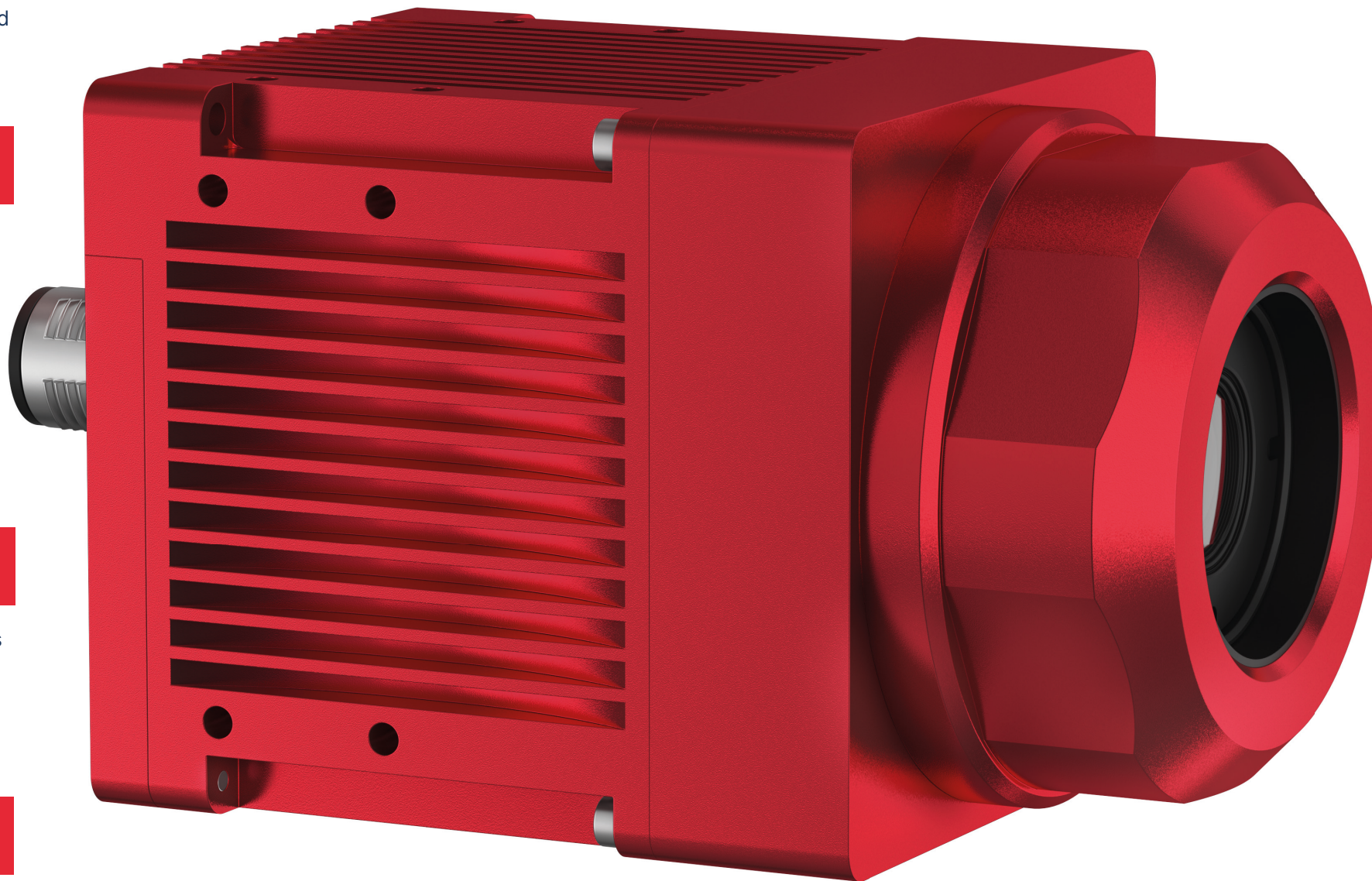✔ Camera simulator for easy job creation and testing

IoT Communication

✔ Multitude of communication protocols (HTTPS, Modbus TCP, REST API, etc.)

✔ Digital I/Os for control and alarming

✔ Encoder interface, e.g, for part tracking on variable speed lines

Robust Industry Design

✔ Easy installation thanks to compact and light weight design

✔ Use in harsh environments without any protective housing thanks to IP67 protection

✔ Rugged housing with air purge for the lens, small enough to fit in the tightest of spaces

Software Support

✔ Consistently growing set of software tools including apps, sensor communication libraries, standard APIs

Precise Measurement

✔ Measurement accuracy of +/- 2°C or +/- 2%

✔ Thermal measurement range -10°C to +550°C

✔ Different models with different resolutions, FoV and frame rates available

Tailored Accessories

✔ For precise and failsafe temperature measurements in any kind of industrial applications

... and it's really smart!

Doing it the Easy Way - Web-based Configuration

The powerful and user-friendly web front-end of the IRSX-I cameras allows for easy configuration of the image and result display. Creating solutions for thermal imaging applications has never been so simple.

✔ Easily configure the interfaces and display parameters as well as measurement plans including the processing of measurement results
✔ Configurations are stored on the camera and can also be exported for the use on other cameras

✔ LUA Script engine for implementing special functions not included in the smart toolset of the camera
✔ Platform independent
✔ Multi-client capable

Configure it on the camera

Doing it the Comfortable Way - IRSX Camera Simulator

✔ The Camera Simulator is a software that comes together with your IRSX-I camera. Install it on a computer and it will simulate an RSX-I camera with all functions including configuration, evaluation and communication protocols
✔ Easily modify existing jobs or create new ones for complete functional testing

✔ Your camera can meanwhile remain on the shop floor where it continues to monitor your installation or your production
✔ Transfer the job to the camera when you are absolutely satisfied with the functions and the results of the tests on the simulator
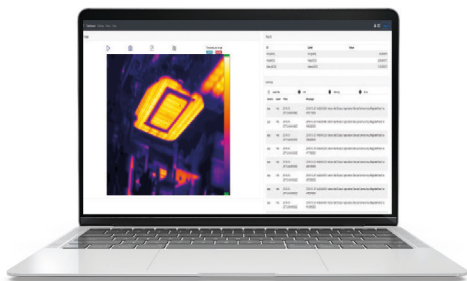
Create and test
it on digital twin

Deploy it

**Configure and test it on the simulator –
... and all while sitting at your desk!**

# Doing it the Customized Way – Create your own Application Solution

You want to display the camera data on your own website? You want to expand the functions of the SmartProcessing app? No problem, create on an application specific website and query camera data via RestAPI.

✔ Lua scripting makes it easy to extend the functionality of the SmartProcessing App
✔ Perform challenging evaluations that are not already included in the camera tool set by implementing your own functions and operations
✔ Query relevant camera data via RestAPI and display it on your web application
✔ Available JavaScript Examples like the CoffeeCupDemo and the SlagDetectionDemo will be provided in our new AT SolutionPackage
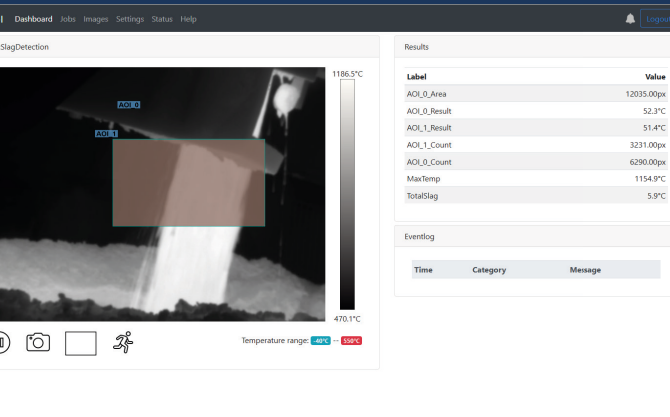
Examples for Tailored HMIs
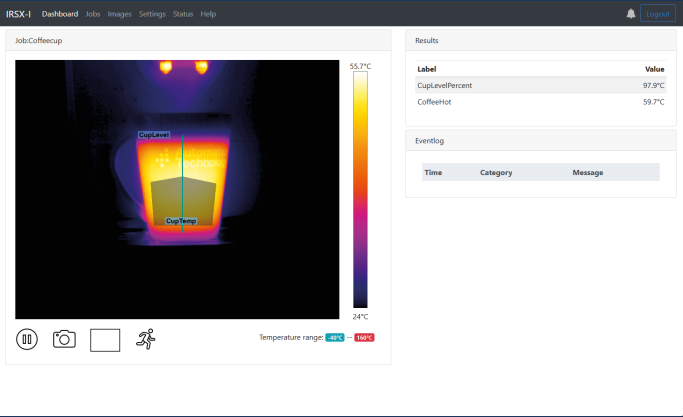
SmartProcessing App
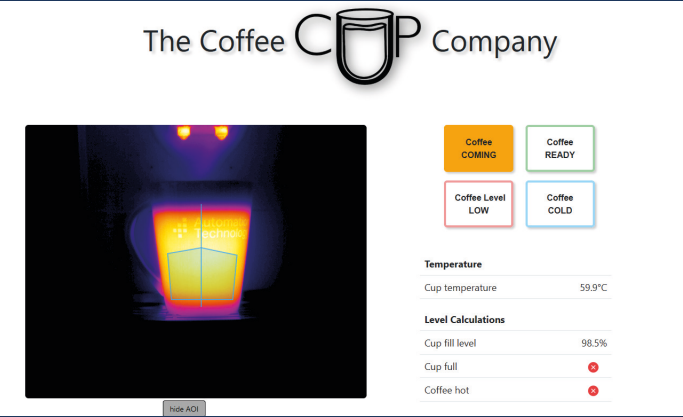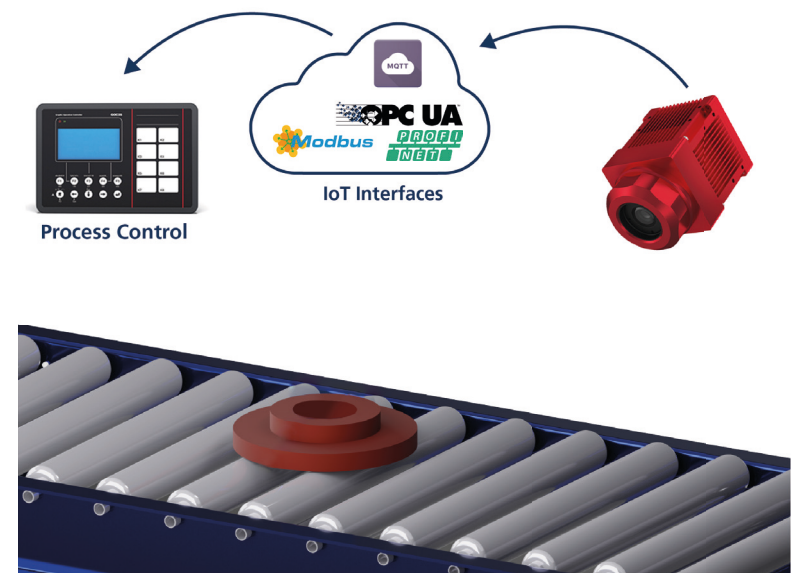

Customized view

SmartProcessing App

Customized view

## Doing it the Integrative Way - Various Standard IoT Interfaces

Easy integration and reliable communication with your process control devices thanks to numerous IoT standard protocols like Modbus TCP, MQTT,OPC-UA or Profinet*.

*MQTT, OPC UA and Profinet will be available soon

Doing it the Maintainable Way - Easy Camera Replacement

With the IRSX-I's worldwide unique job concept, servicing and maintenance is also significantly simplified. Should a camera ever fail, it can be easily replaced by a new one, with the appropriate job automatically uploaded to the camera by the connected Process Control Devices. Temperature monitoring is up and running again after seconds without any need of complicated configurations by specially trained personnel.
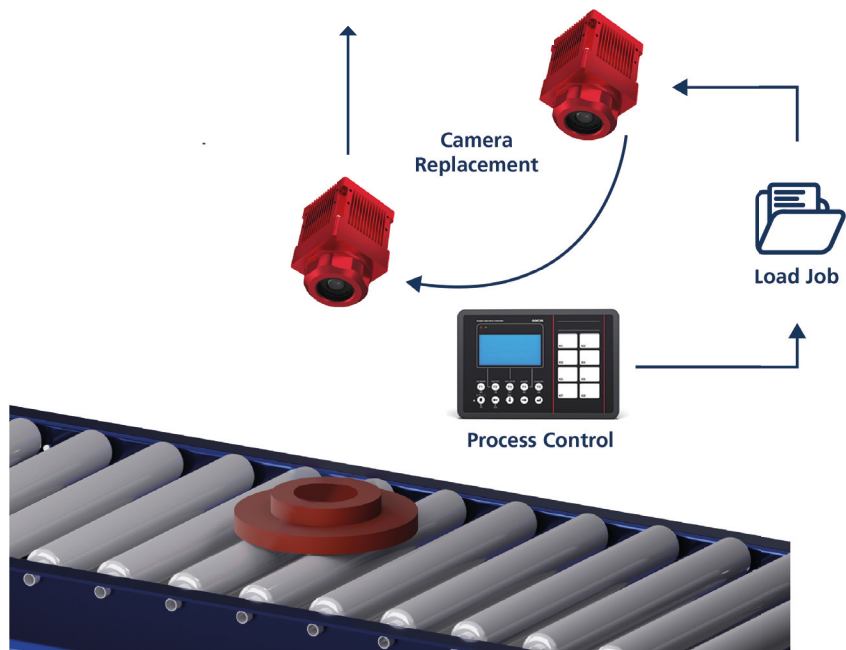
Easiest replacement of a camera thanks to the unique job concept

APPLICATION VARIETY
Suitable for All Industries

Plastics Industry

✔ **Plastics welding, injection molding, thermoforming:** Inline thermal process monitoring for quality assurance

Industrial Infrastructure

✔ **Warehouses** for combustible goods
✔ **Industrial installations** where there is a risk of fire
✔ Detection of critical conditions before a fire outbreak

Iron / Steel / Metals

✔ **Steel ladles:** Condition monitoring of the refactory lining. Avoiding break-outs of liquid steel
✔ **Slag detection:** Quantification and reduction of slag transfer during tapping

Food Industry

✔ **Ready meals:** Checking the sealing of cover foils for defects
✔ **Baked goods, fish, meat, chocolate,...:** Thermal process monitoring during manufacturing

Automotive Industry

✔ **Foamed parts**, e.g. dashboards: Inline inspection for voids in the foam layer
✔ **Hot stamping:** Monitoring the temperature distribution before and after forming to ensure an optimum product quality
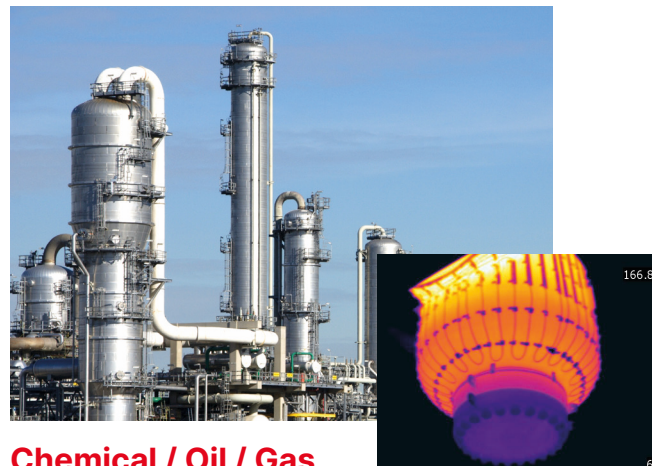
Chemical / Oil / Gas

✔ **Flares:** Monitoring of the pilot flames to comply with environmental regulations
✔ **Reactor vessels, gasifiers:** Condition monitoring to avoid major accidents

Electricity Utilities

✔ **Substations / transformers:** Remote condition monitoring at large distances
✔ Critical conditions can be detected in an early stage, before a damage occurs
✔ Safe and traceable operation of the installations even at maximum power

...and many more!

GigE Vision App

✔ Allows high-speed thermal image streaming based on GigE Vision standard
✔ Complies to the newest GenICam standard

Smart Processing App

✔ Complete functionality to create applications solutions for a stand-alone operation of camera
✔ Web-based configuration of your measurement task and display of results
✔ Supports temperature evaluation based on an unlimited number of ROIs
✔ Supports automatic temperature profile detection and evaluation
✔ Integrated IoT Protocols like **Modbus Server** and
   Client, OPC-UA, MQTT and **Profinet*** for communication with external devices
✔ The integrated **LUA Scripting** engine allows the definition of sophisticated evaluations

AT SolutionPackage

✔ Enables an easy integration of the IRSX cameras into software projects
✔ Provides a C-based application-programming interface (API) and language wrappers for C++, Python, MATLAB and Octave as well as .NET(C#)
✔ Comes with a generic interface for feature description and camera configuration/access based on the GEV/ GenICam transport layer standard

Rest API

✔ The IRSX Series camera provides a RESTful web service described according to OpenAPI 3.0 specification
✔ Allows an easy integration of services and functions of IRSX Smart Apps into your application

*MQTT, OPC UA and Profinet will be available soon

MAXIMUM
Guaranteed Fail-Safe Operation

PRECISION
Doing it the Flexible Way - Optimally Tailored Accessories

With more than 25 years of practice, we have developed the following accessory components specifically tailored with the goal of providing the best tools for precise and fail-safe temperature measurement in various industrial applications.

Smart Blackbody IRS Calilux
✔ Lets you increase the measurement accuracy of an IRSX-I camera up to ±0.3 °C
✔ Camera automatically detects if it's still measuring accurately by transferring the actual blackbody temperature which allows for continuous fail-safe thermal imaging systems
✔ In-field verification of calibration of infrared cameras allows for easy maintenance without uninstalling
✔ Communication between camera and blackbody via Ethernet / WiFi
✔ Comes with a traceable high-precision radiometric calibration

Protective Enclosures
✔ Stainless steel enclosures for installations in harsh industrial environments. Also available as water- or air-cooled versions for environments with high surrounding temperatures
✔ Explosion proof (EX) enclosures. Certified according to the latest ATEX standards for explosion protection zones 1, 2, 21, 22. The certification comprises the camera so that a recertification after installation is not necessary

I/O Panel & Cables
✔ For easily connecting IRSX-I cameras to electrical power and to external components
✔ Provides all signal and power connections on plug terminals
✔ Includes a reverse polarity protection and a 2 A micro fuse
✔ Cables avaible in different lengths

Doing it the Safe Way - Specifications

Camera Model	IRSX-I 336		IRSX-I 640	
Detector Resolution	336 × 256 px		640 × 512 px	
Detector Type	Focal Plane Array (FPA), uncooled microbolometer			
Spectral Range	7.5–13 µm			
Pixel Size	17 × 17 µm			
Frame Rate	9 Hz	60 Hz*	9 Hz	30 Hz*

Measurement				
Imaging Range	Range 1: −25 to +140 °C (−13 to +284°F), range 2: −40 to +550 °C (−40 to +1022°F), optional high-temperature range: +200 to +1200 °C (+392 to 2192°F) (w/ ND filter) depending on model.			
Radiometric Calibrated Range	Range 1: −10 to +140 °C (+14 to +284 °F), range 2: −10 to +550 °C (+14 to +1022 °F), optional high-temperature range: +200 to +1200 °C (+392 to +2192 °F) (w/ ND filter) depending on model.			
Accuracy of Radiometric Calibration	±2 °C (±3.6 °F) or ±2 % of reading (@ +10 to +35 °C (+50 to +95°F) ambient T)			
NETD	< 30 mK (f/1.0, range 1)			

Lenses				
Fixed Lenses	7.5 mm, 9 mm, 13 mm, 19 mm, 25 mm, 35 mm (0.29 in, 0.35 in, 0.51 in, 0.74 in, 0.98 in, 1.37 in)			

Image Processing				
Configuration	Web interface			
Areas of Interest	Spot, line, polyline, elliptical line, rectangular area, elliptical area, polygon area			
Smart Realignment	Intelligent search and compensation algorithm to guarantee accurate temperature readings independent of e.g. machine or part tolerances			
Temperature Evaluation	Min, max, mean, range, variance, standard deviation			
Comparison Functions	Equal, less, greater, in range, out of range			
Script Interface	Scripting w/ LUA			

Interfaces				
Ethernet Protocols	DHCP, DNS, GigE Vision, HTTP(S), mDNS, NTP, FTP, SSH, Modbus TCP, **(**MQTT (TLS), OPC-UA, PTP IEEE1588, Profinet (CC-A, RT-1), ONVIF**)**			
Ethernet Type	10/100/1000 MBit/s	Ethernet connector	8-pin A-coded M12 connector	
Image Streaming Protocol	GigE Vision w/ GenICam, (RTSP)**	Ethernet image streaming	16-Bit, 14-Bit, 8-Bit	
Video out	Available on request			

Input/Output				
Digital Input	2x electrically isolated; 5–24 VDC (max. 27 VDC)	Encoder/resolver input	A+, A–, B+, B–; high-speed, dual RS-422/RS-485 receiver	
Digital Output	2x electrically isolated; 5–24 VDC	Analog output	0–5 VDC	
Digital I/O, Supply Voltage	4.5–30 VDC, max. 100 mA	Analog input	0–5 VDC	

Environmental				
Protection Class	IP67 (IEC 60529)	Bump	200 g (IEC 60068-2-29)	
Operating Temperature Range	−20 to +60 °C (−4 to +140 °F) (non-condensing)	Vibration	4.3 g (IEC 60068-2-6)	
Storage Temperature Range	−50 to 80 °C (−58 to +176°F) (IEC 68-2-1 and IEC 68-2-2)	RoHS	Compliant	
Humidity	0–95 % relative humidity (IEC 60068-2-30)			

Mechanical				
Dimensions	55 × 55 × 77 mm (2.16 × 2.16 × 3.03 in) (w/o lens, w/connectors)			
Weight	270 g (w/o lens)	Base mounting	4x M3 threaded holes (at all 4 sides)	

Accessories	
Adjustable mounting bracket, mounting adaptors, lens protection cap w/Ge window, air barrier, terminal panel, protective enclosures (IRCamSafe series), focus tool	

*   Subject to dual use export regulations (for frame rates > 9 Hz).
()** Coming soon.

Lenses

Focal Length	Field of View [°]		F/#	Hyperfocal Distance	MOD
	IRSX-I336	IRSX-I640			
7.5 mm (0.29 in)	45 × 35	90 × 69	1.4	1.2 m (47.24 in)	25 mm (0.98 in)
9 mm (0.35 in)	35 × 27	69 × 56	1.25 / 1.4	1.7 m (66.92 in)	32 mm (1.25 in)
13 mm (0.51 in)	25 × 19	45 × 37	1.25	4.4 m (173.22 in)	76 mm (2.99 in)
19 mm (0.74 in)	17 × 13	32 × 26	1.25	9.5 m (374.01 in)	153 mm (6.02 in)
25 mm (0.98 in)	13 × 10	24 × 19	1.4	21 m (826.77 in)	300 mm (11.81 in)
35 mm (1.37 in)	9.3 × 7.1	18 × 14	1.5	35 m (1377.95 in)	600 mm (23.62 in)
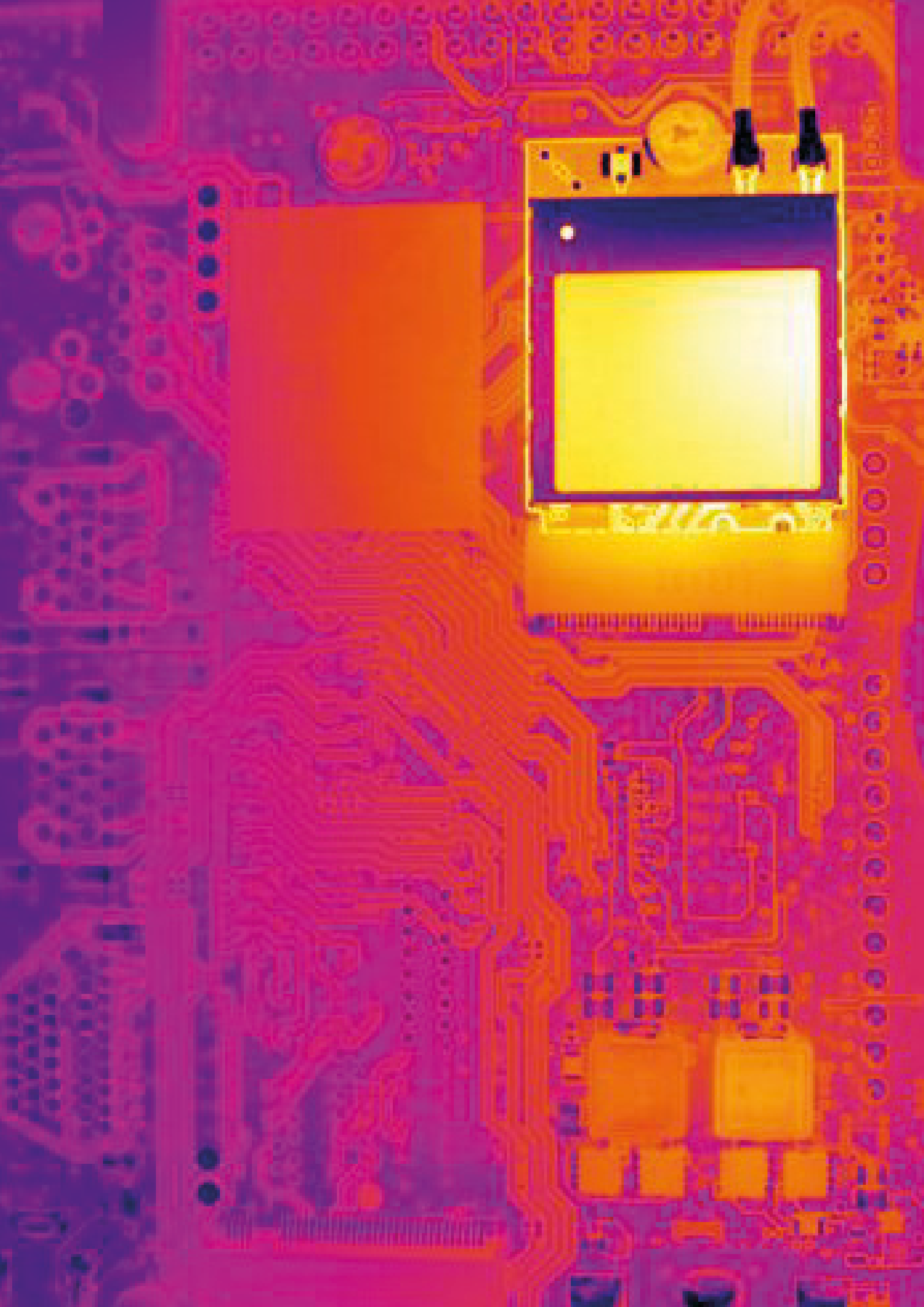
AT •••• SENSORS

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