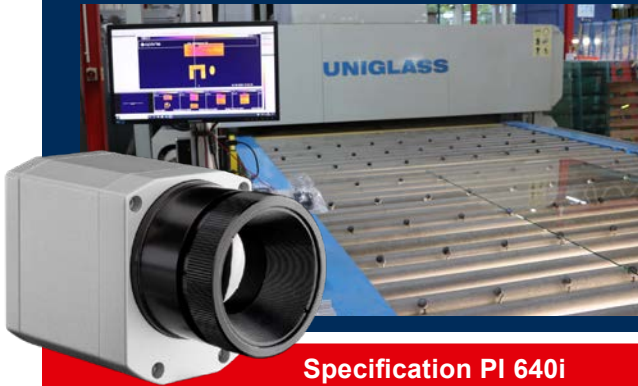## Glass inspection system for process control in glass tempering machines

Features

- Top down system with additional reference pyrometer from underneath for automatic emissivity correction on standard and Low-E glasses

- Digitally controlled lens protection system (DCLP) avoids extra air purging

- Glass area calculation

- Pre-assembled system for easy installation on glass tempering furnaces

- Automatic scan line adjustment – insensitive to distortions

Specification PI 640i

Optical resolution	640 x 480 pixels
Detector	FPA, uncooled (17 µm x 17 µm)
Spectral range	8 – 14 µm
Temperature ranges	–20 ... 100 °C, 0 ... 250 °C, (20) 150 ... 900 °C[1]
Frame rate	32 Hz / 125 Hz @ 640 x 120 pixels
Optics (FOV)	60° x 45° FOV / f = 10.5 mm or 90° x 66° FOV / f = 7.7 mm
Thermal sensitivity (NETD)	40 mK
Accuracy	±2 °C or ±2 %, whichever is greater
PC interface	USB 2.0 / optional USB GigE (PoE) interface
Process interface (PIF), industrial	2x 0 – 10 V input, digital input (max. 24 V), 3x 0/4 – 20 mA output, 3x relais (0 – 30 V/ 400 mA), fail-safe relay
Ambient temperature	0 ... 50 °C
Relative humidity	20 – 80 %, non-condensing
Enclosure (size / rating)	46 x 56 x 76 – 100 mm (depending on lens + focus position) / IP 67 (NEMA)
Weight	269 - 340 g (depending on lens)
Shock / Vibration [2]	IEC 60068-2-27 (25G and 50G), IEC 60068-2-6 (sinus shaped), IEC 60068-2-64 (broadband noise)

Specification reference sensor CT G5L

Temperature range	100 °C ... 1200 °C
Spectral range	5 µm
Optical resolution (90 % energy)	10:1
System accuracy (at T_{Amb} 23 ±5 °C)	±2 °C or ±1 %[3]
Repeatability (at T_{Amb} 23 ±5 °C)	±0.5 °C or ±0.5 %[3]
Temperature resolution (NETD)	0.1 K
Response time (90 % signal)	120 ms
Emissivity/ Gain (adjustable via programming keys or software)	0.100 – 1.100
Environmental rating	IP 65 (NEMA-4)
Ambient temperature	–20 °C ... 85 °C (sensing head) 0 °C ... 85 °C (electronics)
Storage temperature	–40 °C ... 85 °C (sensing head) –40 °C ... 85 °C (electronics)
Vibration (sensor)	IEC 60068-2-6 / -64
Shock (sensor)	IEC 60068-2-27 (25 G and 50 G)
Weight	42 g (sensing head) 420 g (electronics)

Cable length

Electrical cabinet to PI imager (USB, PIF, Shutter)	10 m
Electrical cabinet to reference sensor (CT G5 head cable, Shutter)	10 m
Electrical cabinet to remote control box	10 m
Ethernet, Cat. 6	10 m

[1] Accuracy effective starting at 150 °C
[2] For more details see operator's manual
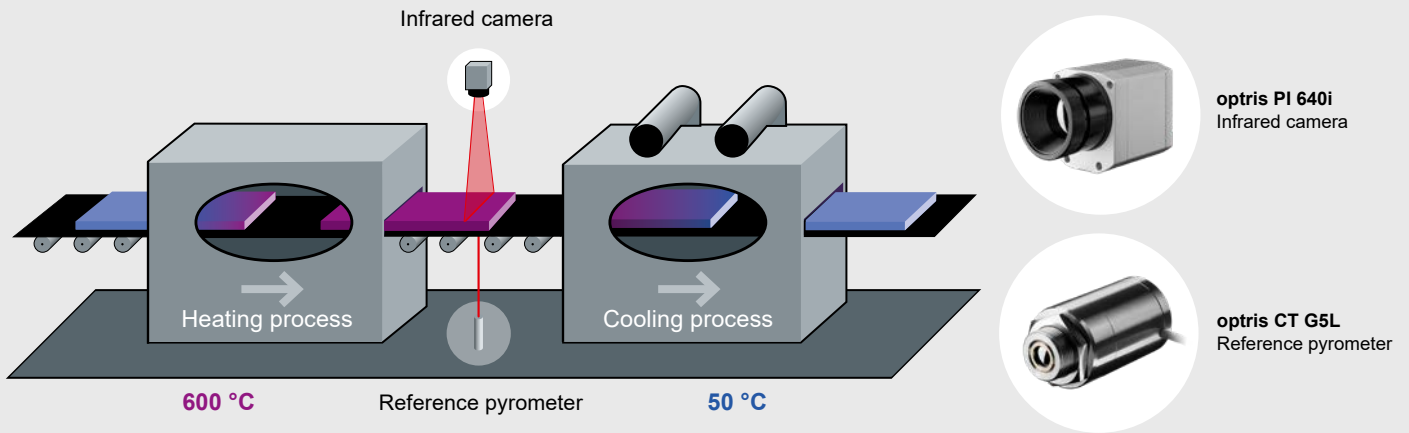[3] Whichever is greater

Scope of supply Top Down GIS 640 R

- PI 640i imager with 60° or 90° FOV
- Industrial Process Interface
- CT G5L reference sensor with USB interface and calibration certificate
- DCLP Shutter system with mounting brackets for imager and reference sensor
- USB Server Gigabit
- Control cabinet
- Cable set
- Remote control box
- Software package
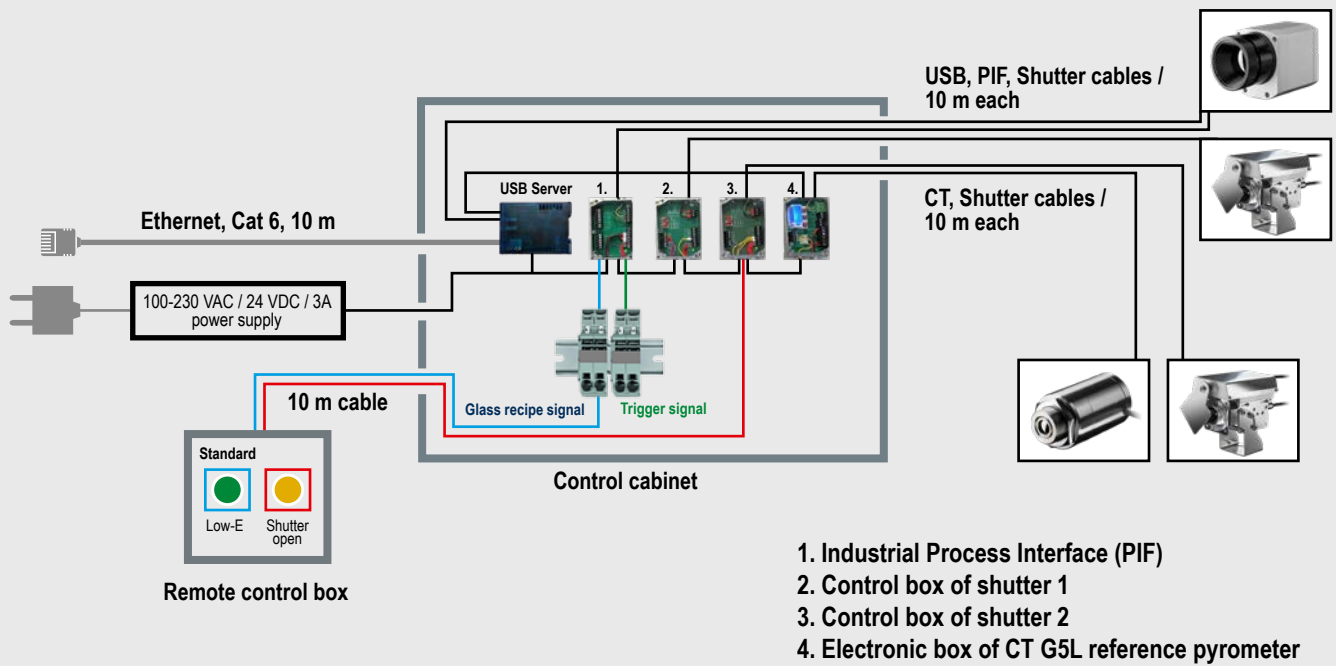- 100-230 V AC/ 24 V DC power supply for initial start-up
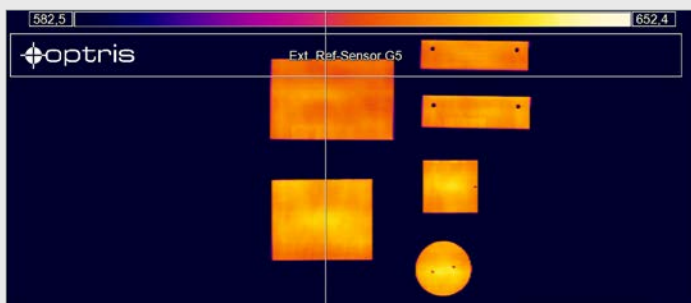
optris **Top Down GIS 640 R**

TECHNICAL DATA

Measurement principle

Infrared camera

optris PI 640i
Infrared camera

optris CT G5L
Reference pyrometer

Heating process

Cooling process

600 °C

Reference pyrometer

50 °C

System overview

**USB, PIF, Shutter cables /
10 m each**

USB Server   1.   2.   3.   4.

Ethernet, Cat 6, 10 m

**CT, Shutter cables /
10 m each**

100-230 VAC / 24 VDC / 3A
power supply

10 m cable

Glass recipe signal   Trigger signal

Standard

Low-E   Shutter open

Remote control box

Control cabinet

1. Industrial Process Interface (PIF)
2. Control box of shutter 1
3. Control box of shutter 2
4. Electronic box of CT G5L reference pyrometer

Thermal image

Monitoring temperature values of different glass sheets

Software PIX Connect

Line scan function with PIX Connect