Glass inspection system for process control in glass tempering machines

### 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)
  - –4 ... 212 °F, 32 ... 482 °F, (68) 302 ... 1652 °F 1)
- **Frame rate**: 32 Hz / 125 Hz @ 640 x 120 pixels
- **Optics (FOV)**: 60° x 45° FOV / f = 10.5 mm (f=0.4 in) or 90° x 66° FOV / f = 7.7 mm (f=0.3 in)
- **Thermal sensitivity (NETD)**: 40 mK
- **Accuracy**: ±2 °C or ±2 % (±3.6 °F 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 relay (0 – 30 V/ 400 mA),
  - fail-safe relay
- **Ambient temperature**: 0 ... 50 °C (32 ... 122 °F)
- **Relative humidity**: 20 – 80 %, non-condensing
- **Enclosure (size / rating)**: 46 x 56 x 76 – 100 mm [1.8 x 2.2 x 3.0 – 3.9 in] (depending on lens + focus position) / IP 67 (NEMA)
- **Weight**: 269 - 340 g (10.59 - 13.38 oz), depending on lens
- **Shock / Vibration**:
  - IEC 60608-2-27 (25G and 50G),
  - IEC 60608-2-6 (sinus shaped),
  - IEC 60608-2-64 (broadband noise)

### Specification reference sensor CT G5L
- **Temperature range**: 100 ... 1200 °C (212 ... 2192 °F)
- **Spectral range**: 5 µm
- **Optical resolution**: 10:1
- **System accuracy**:
  - (at T_{ref} 23 ±5 °C [73 ±9 °F]) ±2 °C or ±1 % (±3.6 °F % or ±1 %)²
- **Repeatability**:
  - (at T_{ref} 23 ±5 °C [73 ±9 °F]) ±0.5 °C or ±0.5 % (±0.9 °F or ±0.5 %)²
- **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 ... 85 °C [-4 ... 176 °F] (sensing head)
  - 0 ... 85 °C [32 ... 176 °F] (electronics)
- **Storage temperature**: –40 ... 85 °C [-40 ... 176 °F] (sensing head)
  - –40 ... 85 °C [-40 ... 176 °F] (electronics)
- **Vibration (sensor)**: IEC 68-2-6: 3 G, 11 – 200 Hz, any axis
- **Shock (sensor)**: IEC 68-2-27: 50 G, 11 ms, any axis
- **Weight**: 42 g (1.5 oz) (sensing head)
  - 420 g (14.8 oz) (electronics)

### 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

### Cable length
- Electrical cabinet to PI imager (USB, PIF, Shutter): 10 m (32.8 ft)
- Electrical cabinet to reference sensor (CT G5 head cable, Shutter): 10 m (32.8 ft)
- Electrical cabinet to remote control box: 10 m (32.8 ft)
- Ethernet, Cat. 6: 10 m (32.8 ft)

1) Accuracy effective starting at 150 °C (302 °F)
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

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**Measurement principle**

Infrared camera

**System overview**

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

Specifications are subject to change without notice.