

# iR2 Ultra-High Performance 2-Color Ratio Fiber Optic Infrared Temperature Measurement and Control System



iR2C, cast aluminum housing shown close to actual size.

## iR2C Complete



Optional

- ✓ 300°C Up to 3000°C (572 to 5432°F)
- ✓ High Quality
- ✓ Ethernet and RS232/485 Available
- ✓ Full Autotune PID Control
- ✓ Unique Built-In "Through-the-Lens" Laser Sighting
- ✓ High Accuracy
- ✓ 2 Color or Single-Color Operation
- ✓ Fiber Optic Cable Assembly is Field Replaceable
- ✓ Embedded Internet on All Models
- ✓ RoHS 2 Compliant



IR probe, with 1 m (3') cable, no extra charge.

## iR2P Complete

Unique "through-the-lens" laser sighting.

iR2P, 1/2 DIN panel mount, shown actual size.



The OMEGA® IR2 Series comprises state-of-the-art instruments for difficult and demanding high-temperature, 300 to 3000°C (572 to 5432°F) applications. It is ideally suited for measurement and control applications involving metals, glass, semiconductors, and more. The iR2 is extremely fast and accurate with a response time of 10 ms and accuracy of 0.2% FS. Despite its extraordinary technological sophistication and performance, the iR2 is also incredibly user friendly and simple to configure. The iR2 is designed to the highest-quality standards and is backed by a 5-year warranty.

### 2-Color Ratio Measurement

The iR2 measures temperature using a 2-color ratio technique in which a temperature is computed from the ratio of 2 different infrared frequencies, unlike a standard infrared thermometer that measures the absolute amount of infrared energy. The 2-color ratio technique is essential for accurate measurements in many common applications: when the target is obscured by smoke or steam, when the target is viewed through a window or screen that reduces energy, or when the emissivity of the target is unknown or changes.

Unlike a standard infrared thermometer that determines an average temperature for everything within its field of view, the iR2 does not require that the target completely fill the lens field of view as long as the temperature of the target is higher than the background or material in the foreground.

This capability allows the iR2 lens to be installed farther from the target, or outside a window or screen, as well as to measure temperatures of small and moving targets more accurately. The iR2 can also be switched to 1-color operation if required.

### Cast-Aluminum or Panel-Mount Enclosure

The iR2 is available in 2 practical packages. The iR2C model is an extremely rugged cast-aluminum enclosure (with NEMA 4 rating) that can be mounted on any surface and is powered by 20 to 36 Vdc or 24 Vac. The iR2P model is a ½ DIN panel mount package with a NEMA 4 front bezel for rack or cabinet mounting with other instrumentation, and runs on 90 to 240 Vac or 110 to 375 Vdc power.

### Full PID Control

The iR2 is much more than an infrared transmitter. It is a complete autotune PID temperature controller an extremely compact enclosure (an important, unique feature). The iR2 features a totally programmable analog output that can be programmed within a range of 0 to 10 Vdc or 0 to 20 mA. The analog output is selectable as either a control output or as a calibrated retransmission of the temperature. The iR2 also offers a choice of 2 form "C" (SPDT) relays or solid state relays for controlling or alarms. The control functions feature the full suite of capabilities from simple on/off to full proportional integral derivative (PID) control. Instead of connecting a simple infrared transmitter to a separate temperature controller, the iR2 can do it all.

### Big, Bright Display

The iR2 features a big, bright LED dual display. The smaller numbers display the setpoints or alarm points. The larger numbers (a full 21 mm [0.83"] high) display the measured temperature. The display can be programmed to change color between **GREEN**, **AMBER**, and **RED** at any setpoint or alarm point, and the change in color is quickly seen from a distance.

Dimensions: mm (inch)



iR Probe, with CO3 1 m (3') cable, no extra charge.

### Fiber Optics

The iR2 comes with a compact NEMA 4 lens and a flexible fiber optic cable assembly. With the iR2, it's possible to measure the temperature of targets that would simply not be visible with conventional instruments. The fiber optic cable and lens allow the instrument electronics to be kept away from the target environment where it would be subjected to higher temperatures, smoke, dust, steam, or powerful electromagnetic emissions such as those generated by induction heating.

Both the stainless steel lens assembly and rugged cable assembly can be replaced in the field without returning the instrument for recalibration (a unique feature). The lens can operate in ambient temperatures up to 200°C (392°F) without external cooling. The variable-focus lens can focus on targets from any distance between 200 mm (8") and more than 4 m (14'). The 25:1 field of view is ideal for most applications.

OMEGA also offers a wide selection of compatible application-specific lens assemblies and fiber optic probes developed during 3 decades of experience servicing the most demanding infrared temperature applications.

### Unique Built-In Laser Sight

The iR2 features a unique built-in "through-the-lens" laser that shows the operator precisely what the lens is seeing (spot size). This innovative laser illuminates the precise spot on the target that the lens is viewing, and allows the operator to focus on the target with absolute precision. The laser can be turned on to sight the target and off to make a measurement with the simple pushbutton on the front panel, or remotely via network or serial communications. The cable and lens do not have to be disconnected and connected to a separate apparatus to provide a conventional or laser light for sighting.



iR2C cast aluminum enclosure.



iR2P 1/2 DIN panel mount.

Shown smaller than actual size.

## Specifications

**Accuracy:** 0.2% FS

**Repeatability:** 0.2% FS

**Temperature Resolution:** 1°

**Temperature Ranges:**

**Single Color:** 300 to 1300°C (572 to 2372°F)

**Dual Color:** 450 to 1300°C (842 to 2372°F)

**600 to 1800°C (1112 to 3272°F):**

Single and dual color

**1000 to 3000°C (1832 to 5432°F):**

Single and dual color

**Response Time:** 10 ms

(0 to 63% of final value)

**Spectral Response:** 0.8 to 1.7 microns

**Infrared Temperature Measurement:**

Selectable between single color and dual color

**Emissivity:** Adjustable

0.1 to 1.0 (single color)

**Slope:** 0.85 to 1.15 (two color)

**Optical Field of View:** 25:1,

Adjustable focus from 200 mm to more than 4 m distance (8" to 14'), std

**Laser Beam Diameter:**

2 mm (0.078") spot size @ 150 mm

(5.90") distance-L2MM, 3 mm (0.11")

spot size @ 225 mm (8.85")

distance-L3MM, smallest spot size, 8

mm (0.32"); minimal focus distance is

200 mm (8"), std

**Dimensions (Optical Assembly):**

20 x 62 mm (0.79 x 2.43")

maximum length

**Fiber Optic Cable:** 1 m included, 2, 3

and 10 m optional (3, 6, 10 and 32')

## Power:

**IR2P:** 90 to 240 Vac or 110 to 375 Vdc

**IR2C:** 20 to 36 Vdc or 24 Vac

**Display:** 3-color dual display (AMBER, GREEN and RED), programmable

**Operating Temperature:**

**Controller:** 0 to 50°C (32 to 122°F)

**Optical Assembly:** 0 to 200°C

(32 to 392°F), without cooling

required; higher ambient temperature optical assemblies available

**Environmental Rating:**

NEMA 4 (IP65) (both the optical assembly and the front panel)

**Serial Communications:**

RS232 and RS485/422 or Ethernet and RS485/422

**Controller:** On/off or

PID controller with autotune

**Outputs:** 2 control or alarm outputs

**Output Type:** Analog voltage

or current, relay, DC pulse

**Analog Output Response:** 1 second

**Pulse Output Response:** 1 second

**Laser Sighting:** Built into the controller for optical assembly alignment

**Wavelength (Color):** 650 nm (red)

**Operating Distance:**

200 mm to 4 m (8" to 14')

**Maximum Laser Power Output:** <1 mW

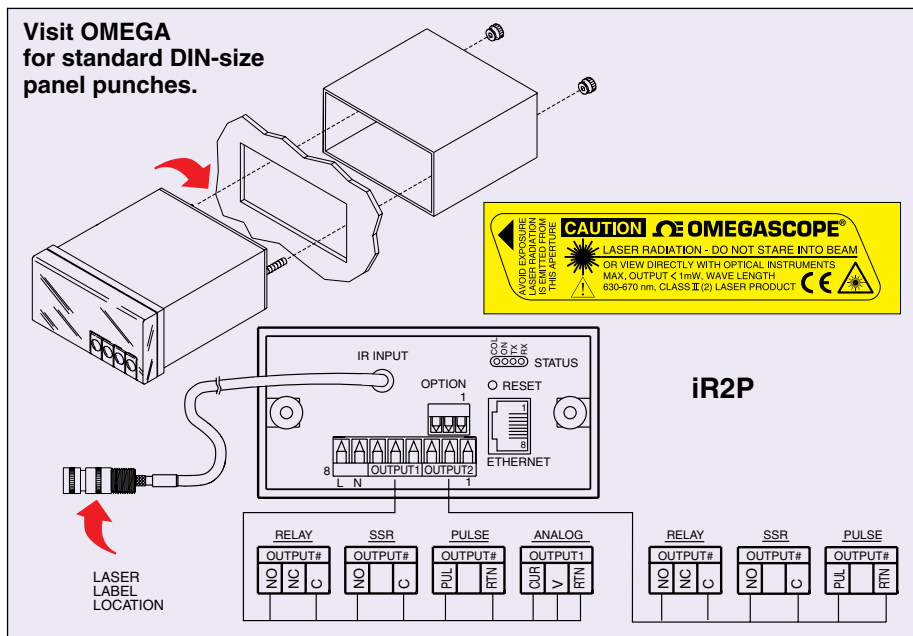
**Safety Classification:** Class 2, complies with FDA 21 CFR 1040.10, EN60825-1/11.2001

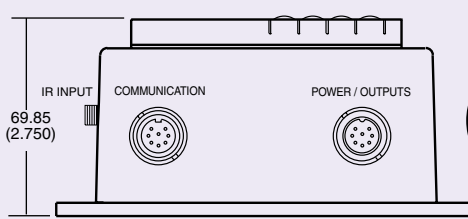
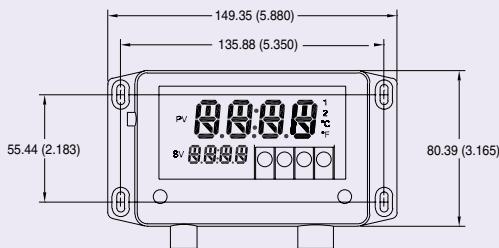
**Laser Power Switch:** Set via the controller menu

**Laser Indicator:**

Displays on the controller

Visit OMEGA for standard DIN-size panel punches.

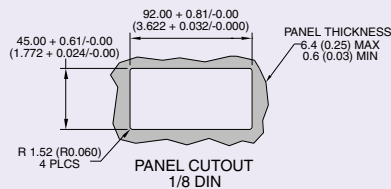




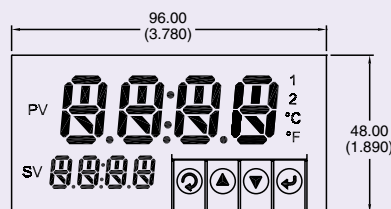
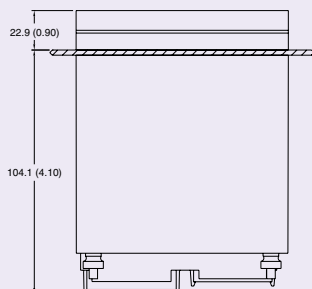
### iR2C

- 1 OUTPUT#2 N.O.
- 2 OUTPUT#1 N.C.
- 3 DC (-) RETURN
- 4 OUTPUT#1 COM.
- 5 OUTPUT#1 N.O.
- 6 OUTPUT#2 N.C.
- 7 DC (+)
- 8 OUTPUT#2 COM.

Dimensions: mm (inch)



### iR2P



The iR2 can control a process with simple on/off control through full autotune PID control, and everything in between. The dual control outputs can be configured for a variety of independent control and alarm applications such as heat/heat, heat/cool, heat/alarm, and more. The ramp-to-setpoint feature allows the user to define the rate of rise to setpoint, minimizing thermal shock to the load during start-up.



## To Order

Model No.	Description
<b>iR2P</b>	1/8 DIN panel mount enclosure (90 to 240 Vac or 110 to 375 Vdc)
<b>iR2C</b>	Cast aluminum enclosure, 20 to 36 Vdc or 24 Vac
<b>Range (Select One)</b>	
<b>-300</b>	300 to 1300°C (572 to 2372°F)
<b>-600</b>	600 to 1800°C (1112 to 3272°F)
<b>-1000</b>	1000 to 3000°C (1832 to 5432°F)
<b>Output Options (Select One)†</b>	
<b>-53</b>	1 Programmable analog output selectable as either control or retransmission of the process value, 0 to 10 Vdc or 4 to 20 mA plus form "C" SPDT relay 3 A @ 120 Vac, 3 A @ 240 Vac for iR2P; 200 mA @ 30 Vdc for iR2C
<b>-43</b>	Pulsed 10 Vdc @ 20 mA (for use with external SSR) and form "C" SPDT 3 A @ 120 Vac, 3 A @ 240 Vac for iR2P; 200 mA @ 30 Vdc for iR2C
<b>-33</b>	2 relays form "C" SPDT relay 3 A @ 120 Vac, 3 A @ 240 Vac for iR2P; 200 mA @ 30 Vdc for iR2C
<b>Network Options (Select One)</b>	
<b>-C24</b>	Isolated RS232 and RS485/422, 300 to 19.2K baud (if required)
<b>-C4EI</b>	Ethernet with embedded Web server and isolated RS485/422/MODBUS
<b>Optical Assemblies (Select One)</b>	
*	Standard variable focal lengths; focal distance from lens to target variable between 200 mm to 4 m; spot size ratio 25:1 (8 mm spot size @ 200 mm distance) no entry required
<b>-L2MM</b>	2 mm spot size @ fixed focal length distance of 150 mm (75:1)
<b>-L3MM</b>	3 mm spot size @ fixed focal length distance of 225 mm (75:1)
<b>High Ambient Temperature Option</b>	
<b>-HT</b>	High ambient 0 to 300°C lens, cable assembly and 0.9 m (3') fiber optic quartz cable (consult sales for longer lengths)

† Other output combinations are available, consult engineering for details.

**Ordering Example:** **iR2C-1000-53-C4EI**, 2-color infrared temperature controller in a rugged cast aluminum enclosure, with 8 mm spot size optic lens assembly, temperature range of 1000 to 3000°C (1832 to 5432°F), programmable analog output, 1 SPDT form "C" relay, Ethernet, RS485/422/MODBUS and **iR2-06**, 1.8 m (6') fiber optic cable [substitute for standard and 1 m (3') cable].

## Accessories

Model No.	Description
<b>iR2-03*</b>	Replacement 1 m (3') fiber optic cable
<b>iR2-06*</b>	1.8 m (6') fiber optic cable
<b>iR2-10*</b>	3.0 m (10') fiber optic cable
<b>iR2-30*</b>	10 m (32.8') fiber optic cable
<b>iR2-03Q**</b>	1 m (3') fiber optic quartz cable
<b>iR2-06Q**</b>	1.8 m (6') fiber optic quartz cable
<b>iR2-10Q**</b>	3.0 m (10') fiber optic quartz cable
<b>iR2-LENS</b>	Standard lens with 8 mm spot size @ fixed focal distance of 200 mm (25:1)
<b>iR2-L2MM</b>	Lens with 2 mm spot size @ fixed focal distance of 150 mm (75:1)
<b>iR2-L3MM</b>	Lens with 3 mm spot size @ fixed focal distance of 225 mm (75:1)
<b>CAL3-iR2††</b>	NIST-traceable calibration with 5 data points

**Note:** 1 m (3') fiber optic cable is standard length with controller unless different cable length is selected. Comes complete with lens assembly and operator's manual.

\* For -600 and -100 ranges only. \*\* For -300 range only.