

Heat Spy® Monitor High Performance Fixed Infrared Sensor R40 Series

Utilizing the R40 Heat Spy Monitor will give you consistent measurements and greater confidence in process results. With accuracy of up to 0.25% of reading and 1°F / °C resolution, your surface temperature measurements will be highly accurate, resulting in high quality products, for a wide range of applications.

This high tech non-contact infrared sensor is designed to meet all application requirements with high performance and advanced functionality. Rugged, IP65 (NEMA 4) sealed single-piece system, with optics and electronics built into one housing, the R40 is easy to install and has the flexibility to handle nearly any application.

The R40 includes signal processing features including Peak Hold, Valley Hold and Averaging, all of which are adjustable on-site via the keypad or controlled remotely when interfaced with user's software.

The R40 Series offers models for use in:

- Ferrous Metal (Model 1M)
- Hot Metal and Ceramics (Model 2M)
- Cold Ferrous Metal (Model 3M*)
- Combustion: Thru Flame (Model MT)
Burning Gas (Model F4)
- Glass: Thick Glass (Model G5)
Thin Glass (Model G7)
- Plastic Thin-Film: Polyethylene Films (Model P3)
Polyester Films (Model P7)
- Low Temperature Processes (Model LT)

* Model 3M is used for Iron, Steel and Steel Alloy.

It is not for use with Aluminum, Brass, Bronze, Copper, Lead, Nickel, Titanium and Zinc.

R40 Series Features

Back-lit 5-Digit LCD display with 4-Key Pad for convenient on-site viewing and setting.

12-Pin connection cable for simultaneous analog/digital input and output.

- 0-20 or 4-20 mA Linear Current Loop, sub-range programmable, user selectable.
- RS485 for networking, up to 32 sensors.
- Relay for alarm and PLC control, user programmable.
- External Input for reset and parameter adjusting of AVG, PEAK HOLD and VALLEY HOLD.

Built-in Laser to simplify alignment operation. (Not available on Models F4 or P3)

Programmable for OEM applications through RS485 for remote setup and monitoring.

Optional non-contact Thermocouple Type IR tube with extremely long life is available as an alternative to traditional contact thermocouples.

Backed by our 2 year warranty, the R40 can be used in a wide range of applications, assuring confidence in your process results.

Heat Spy® is a registered trademark of Palmer Wahl Instruments, Inc.

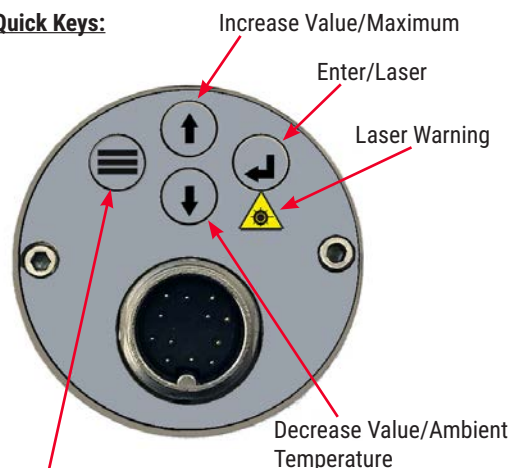
Specifications subject to change without notice. Go to www.palmerwahl.com for most current information.



R40 Fixed Infrared Sensor shown with Air/Water Cooling Jacket, Air Purge and Adjustable Surface Mount Bracket

R40 Series Menu Functions

Quick Keys:



LCD Display Menu Selections to view and set:

- | | |
|------------------------------------|--------------------------|
| - Real Time Temperature | - Low End of mA T Range |
| - Emissivity | - Laser Setting |
| - Transmission | - Alarm Low |
| - Average/Peak/Valley Select | - Alarm High |
| - Average/Peak/Valley Time Setting | - Multiple Sensor ID |
| - Analog Output Selection | - Baud Rate |
| - High End of mA T Range | - Temperature Unit °F/°C |
| - Back Light Setting | |



R40 Series Models and Applications

Model Code	Type	Spectral Range	Temperature Span	Application
Molten, Hot and Cold Metal Applications				
1M	Ferrous Metal	1.0μm	400° to 3000°C (752° to 5432°F)	Ferrous Metal Molten Glass Molten Metal Molten Ceramics Hot Graphite
2M	Hot Metal, Hot Ceramic	1.6μm	300° to 2300°C, (572° to 4172°F)	Hot Metal Hot Ceramic
3M	Cold Ferrous Metal	2.4μm	150° to 1000°C (302° to 1832°F)	Cold Ferrous Metal Iron, Steel and Steel Alloy

Model 3M is used for Iron, Steel and Steel Alloy.

It is not for use with Aluminum, Brass, Bronze, Copper, Lead, Nickel, Titanium and Zinc.



Model Code	Type	Spectral Range	Temperature Span	Application
Heating and Furnace Applications				
MT	Thru Flame	3.9μm	600° to 1500°C (1112° to 2732°F)	Thru hot furnace gases and clean burning gas flames, indicates correct temperatures of substances during warm up process in industrial furnaces
F4	Burning Gas	4.11 - 4.72μm	400° to 1600°C (752° to 2912°F)	CO ₂ Gas (4.24 Micron) in Chimney NO ₂ Gas (4.55 Micron) in Combustion Hot CO Gas (4.66 Micron) in Combustion Flame Temperature in Boiler / Furnace Utility Power Station Biomass Boilers Furnaces Garbage Incinerators Hazardous Waste Kilns



R40 Series Models and Applications

Model Code	Type	Spectral Range	Temperature Span	Application
Glass Applications				
G5	Thick Glass	5.0μm	400° to 2250°C (752° to 4082°F)	Glass above 1 mm thickness Flat Glass Production Glass Bending Automobile Glass Assembly
G7	Thin Glass	7.9μm	40° to 1000°C (104° to 1832°F)	Thin Glass Below 1 mm thickness Light Bulb Production Medical Vial Production



Model Code	Type	Spectral Range	Temperature Span	Application
Plastics Applications				
P3	Thin Film Plastics	3.43μm	100° to 500°C (212 °to 932°F)	Plastic Thin Film (1 to 3 mil), Polyethylene Films and all types of fluorocarbon-plastics Polyethylene (PE) Polypropylene (PP) Polyamide (Nylon) Polystyrene (PS) Polyvinyl Chloride (PVC) Polyurethane Vinyl / Acrylic / Polycarbonate Cellophane
P7	Thin Film Plastics	7.9μm	40° to 600°C (104° to 1112°F)	Plastic Thin Film, (1 to 3 mil) Polyester Films and all types of fluorocarbon-plastics Polyester Cellulose Acetate Polyurethane Teflon (Fluoroplastic FEP) Polyvinyl Chloride (PVC) Acrylic / Polycarbonate Polyamide (Nylon) Polyester (>10 μm)



Model Code	Type	Spectral Range	Temperature Span	Application
Low Temperature Applications				
LT	Low Temp	8 to 14μm	-40° to 800°C (-40° to 1472°F)	Organic Materials Baking Production Painted Metal Surfaces Rubber, Tires Paper Textiles Thicker Plastics



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R40 Series Specifications

High Performance Fixed Infrared Sensor			
MEASURING SPECIFICATIONS	Model Numbers	1M / 2M / 3M	MT / F4 / G5 / G7 / P3 ⁴ / P7 / LT
	Accuracy ¹	± 0.25% of reading or ± 1°C	± 0.6% of reading or ± 1°C, whichever is higher
	Repeatability ²	± 0.10% of reading or ± 1°C, whichever is greater	± 0.3% of reading or ± 0.3°C, whichever is greater
	LCD Resolution	1°F / 1°C	1°F / 1°C
	Response Time ³	5 mS	150 mS
	Emissivity	0.10 to 1.00	0.10 to 1.00
ELECTRONIC SPECIFICATIONS	Display	LCD, 5-digit, 1° Resolution	
	Keyboard	4 - Key	
	Analog Output	0-20mA, 4-20mA	
	Digital Output	RS485	
	Alarm	High or Low	
	Signal Processing	AVG / PEAK HOLD / VALLEY HOLD	
	Relay	User Programmable	
	Cable	12-pin Connection Cable	
	Power Supply	24 VDC Nominal, (10 - 32 VDC)	
SENSOR SPECIFICATIONS	Ambient Temperature	0° to 65°C, (32° to 149°F)	
		With Air Cooling: 0° to 120°C, (32° to 250°F)	
		With Water Cooling: 0° to 175°C, (32° to 350°F)	
	Storage Temperature	-20° to 70°C (-4° to 158°F)	
	Relative Humidity	10% to 95% non-condensing	
ENCLOSURE	Protection Class	IP65 (NEMA-4)	
	Laser Sight	650 nm <1mW, Class II	
	Shock & Vibration	MIL-STD-810D	
	Housing Material	ANSI 304 Stainless Steel	
	Housing Dimensions / Weight	1.77 x 7.20 in (45mm Dia. x 183mm) / 1.58 lbs (0.72 kg)	

¹ at ambient temperature 23°C, ε = 1.0, NIST transfer standard.

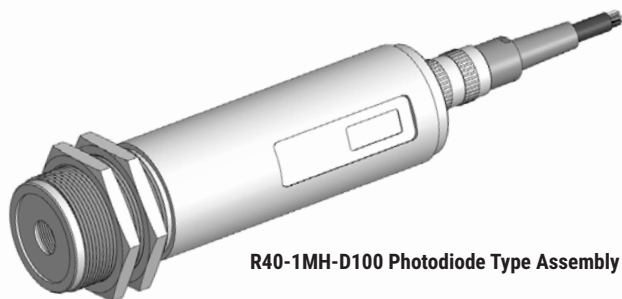
² at ambient temperature 23°C.

³ 90% of value.

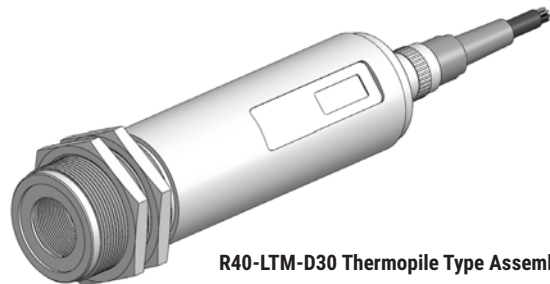
⁴ after 20 minute warm-up.

The Wahl DHS40 conforms to RoHS requirements according to EU Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU for restriction of Hazardous substances.

R40 Series Assembly



R40-1MH-D100 Photodiode Type Assembly



R40-LTM-D30 Thermopile Type Assembly

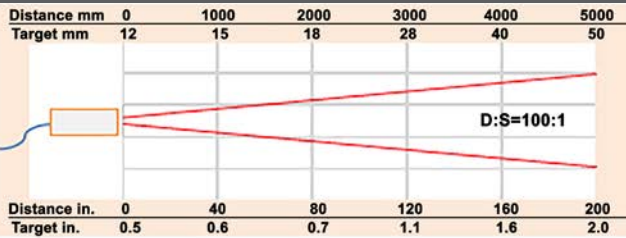


R40 Series Optics Diagrams

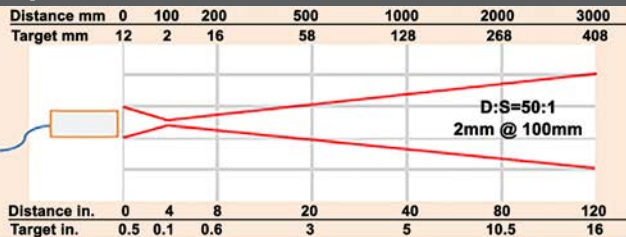
Photodiode Models

1M / 2M / 3M OPTICS

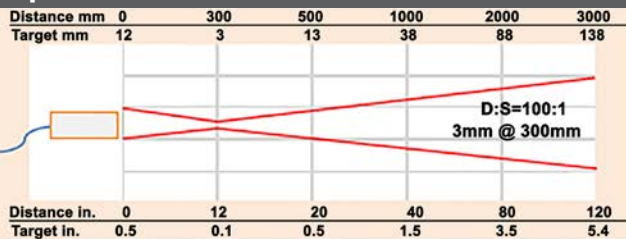
Optics Code: D100



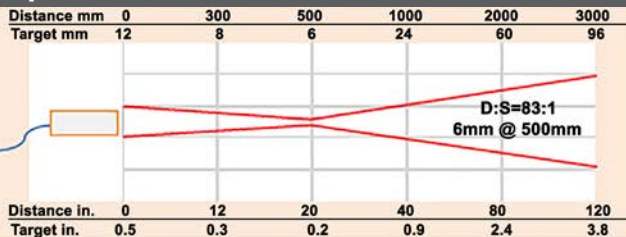
Optics Code: F100



Optics Code: F300



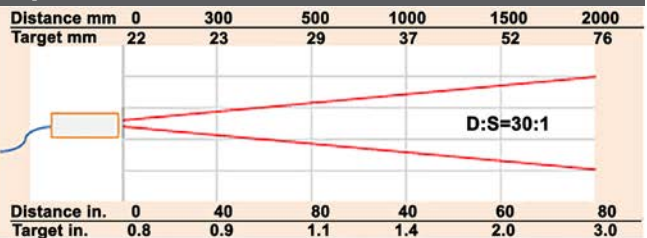
Optics Code: F500



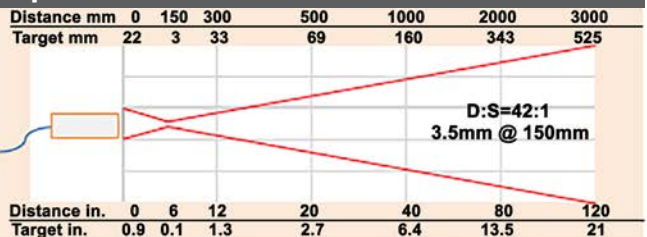
Thermopile Models

P3 / MT / F4 / G5 / P7 / G7 / LT OPTICS

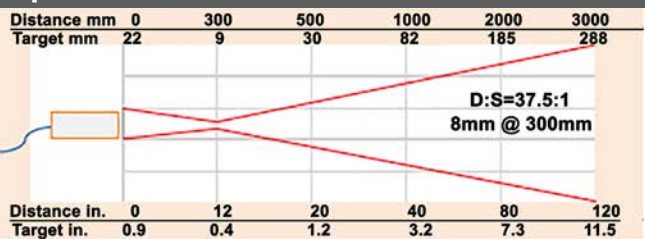
Optics Code: D30



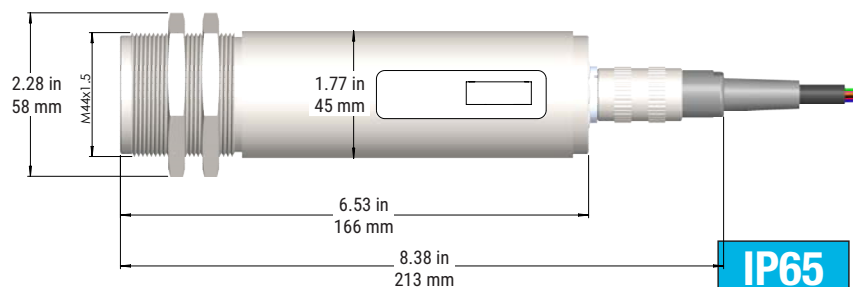
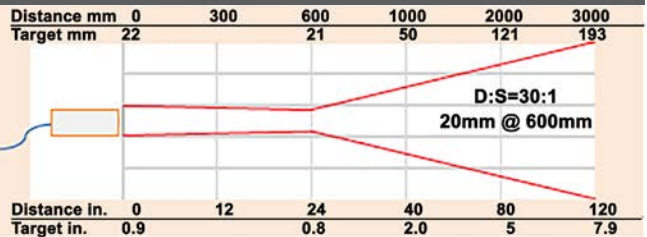
Optics Code: F150



Optics Code: F300



Optics Code: F600



R401MMD100 Assembly - Dimensions



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R40 Series Accessories

MOUNTING SYSTEM OPTIONS

SURFACE MOUNT

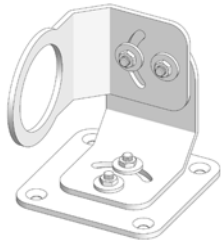
R40 Surface Mount Brackets:

16451 - R40 Surface Mount Bracket, Fixed, Diameter: 45mm (1.77")

16453 - R40 Surface Mount Bracket, Adjustable, Dia: 45mm (1.77")



16451 - Surface Mount Bracket, Fixed



16453 - Surface Mount Bracket, Adjustable

WALL MOUNT

R40 Series Mounting Flange:

16483D-44 - R40 Series Wall Mount Flange



16483D-44 - Wall Mount Flange

SIGHTING / IR TUBES

R40/60 Series Sighting Tube for use with R40 Optics Code

D100 (D to S: 100:1). M30 x 1, Length: 11.81 in. (300 mm)

16491-1 - SS304, 1500°F (800°C)

16491-2 - Inconel, 2000°F (1100°C)

16491-3 - Silicon Carbide, 3000°F (1600°C)

16491-4 - High Purity Alumina, (99.8%), 3500°F (1900°C)

16491-5 - Glassy Carbon, 5430°F (3000°C)



Use a Sighting Tube to avoid reflected energy in temperature measurement environments. Sighting tubes should be used when the target is blocked by fumes or flames. Use together with an air purge system for a clean viewing path from target to the thermometer.

R40/60 Series Thermocouple IR Tube for use with R40 Optics Code F300

(D to S: 100:1). M30 x 1, Length: 11.81 in. (300 mm)

16492-1 - SS304, 1500°F (800°C)

16492-2 - Inconel, 2000°F (1100°C)

16492-3 - Silicon Carbide, 3000°F (1600°C)

16492-4 - High Purity Alumina, (99.8%), 3500°F (1900°C)

16492-5 - Glassy Carbon, 5430°F (3000°C)



The Thermocouple IR Tube includes a protective thermowell, infrared lens, fiber optic cable and remote electronics. Infrared radiation from the bottom of the well is transmitted by the optical fiber to the detector.

AIR PURGE

R40 Compact Air Purge:

16472 - R40 Air Purge



16472 - Air Purge

An Air Purge is used to eliminate dust, dirt, heat, steam, smoke, fumes, particles or vapors from the front of the optical head, and to keep the lens clean.

PROTECTION WINDOWS

R40 Protection Windows (includes Locking Ring):

16465-1 - BK7 Protection Window for R40 for use with 1M and 2M Models.

16465-2 - Sapphire Protection Window for R40 for use with 1M, 2M, MT, F4 and G5 Models.

16465-3 - ZnSe Protection Window for R40 for use with P3, MT, F4, G5, P7 and LT Models.



Shown above: Locking Ring and Protection Window with Air Purge

Protection windows are necessary in excessively harsh environments. Window not needed on 3M units.

AIR/WATER COOLING JACKET

R40 Air/Water Cooling Jacket:

16460C - R40 Air/Water Cooling Jacket



For a detector installed in a very hot environment a cooling jacket is used to cool the electronics.

POWER SUPPLY

Power Supply:

16116 - Compact AC/DC Power Supply, 24V, 31W (for use outside control box)

16117 - AC/DC Power Supply, 24V, 25 to 150 W (for use inside control box)



16116



16117

R40 Series Order Guide

Photodiode Models Step 1 - Select: Series				
R40	Heat Spy High Performance Fixed Infrareads Photodiode Models			
	Code	Step 2 - Select: Spectral, Temperature Range		Application
	1ML	1.0µm	400° to 1800°C, (752° to 3272°F)	Ferrous Metal, Molten Glass, Molten Metal/Ceramics, Hot Graphite
	1MM		600° to 1800°C, (1112° to 3272°F)	
	1MH		600° to 3000°C, (1112° to 5432°F)	
	2ML	1.6µm	300° to 1400°C, (572° to 2552°F)	Hot Metal & Hot Ceramic
	2MM		400° to 1600°C, (752° to 2912°F)	
	2MH		400° to 2300°C, (752° to 4172°F)	
	3ML	2.4µm	150° to 1000°C, (302° to 1832°F)	Cold Ferrous Metal
	Code	Step 3 - Select: Optics		
	D100	100:1		
	F100	2mm@100mm, 50:1		
	F300	3mm@300mm, 100:1		
	F500	6mm@500mm, 83:1		
	Code	Step 4 - Select: Connection Cable Length		
	CB1	1 meter, (3.28 Feet) Standard		
	CB3	3 meters, (9.84 Feet)		
	CB5	5 meters, (16.40 Feet)		
	CB8	8 meters, (26.24 Feet)		
	CB15	15 meters, (49.21 Feet)		
	CBX	Customer Specified Length. Max 100m (300 ft)		

R40				
Series	Model	Optics	Cable Length	
Includes: Certificate of Conformance and User Manual				
Note: Models R401ML and R403ML are not available at this time. DO NOT QUOTE. No Lead Time is available. Product will be formally announced when available.				
Model 3M is used for Iron, Steel and Steel Alloy. It is not for use with Aluminum, Brass, Bronze, Copper, Lead, Nickel, Titanium and Zinc.				

Add desired Accessories (shown on previous pages) as separate line items.

Model # Example:

R401MLF500CB3: R40 1ML Series, 1.0µm
Spectral Range, 600° to 1800°C,
(1112° to 3272°F) Temperature Range,
6mm@500mm Focal Point, 83:1 D to S,
3 meter Connection Cable Length.

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R40 Series Order Guide

Thermopile Models Step 1 - Select: Series				
R40	Heat Spy High Performance Fixed Infrareads Thermopile Models			
	Code	Step 2 - Select: Model, Spectral & Temperature Range		Application
	MTM	3.9µm	600° to 1300°C, (1112° to 2372°F)	Thru Flame
	MTH		600° to 1500°C, (1112° to 2732°F)	
	F4M	4.11 to 4.72µm	400° to 1500°C, (752° to 2732°F)	Burning Gas
	F4H		400° to 1600°C, (752° to 2912°F)	
	G5M	5.1µm	400° to 1600°C, (752° to 2912°F)	Thick Glass
	G5H		400° to 2250°C, (752° to 4082°F)	
	G7	7.9µm	40° to 1000°C, (104° to 1832°F)	Thin Glass
	P3M	3.43µm	100° to 300°C, (212° to 572°F)	Polyethylene Films
	P3H		100° to 500°C, (212° to 932°F)	
	P7	7.9µm	40° to 600°C, (104° to 1112°F)	Polyester Films
	LTL	8 to 14µm	-40° to 600°C, (-40° to 1112°F)	Low Temperature
	LTM		-40° to 800°C, (-40° to 1472°F)	Medium Temperature
	Code	Step 3 - Select: Optics		
	D30	30:1		
	F150	3.5mm@150mm, 42:1		
	F300	8mm@300mm, 37.5:1		
	F600	20mm@600mm, 30:1		
	Code	Step 4 - Select: Connection Cable Length		
	CB1	1 meter, (3.28 Feet) Standard		
	CB3	3 meters, (9.84 Feet)		
	CB5	5 meters, (16.40 Feet)		
	CB8	8 meters, (26.24 Feet)		
	CB15	15 meters, (49.21 Feet)		
	CBX	Customer Specified Length (100 m (300 ft) Max)		

R40				
Series	Model	Optics	Cable Length	
Includes: Certificate of Conformance and User Manual				

Add desired Accessories (shown on previous pages) as separate line items.

Model # Example:

R40P3HF150CB5: R40 Series, 3.43µm Spectral Range, 100° to 500°C, (212° to 932°F) Temperature Range, 7mm@150mm Focal Point, 50:1 D to S, 5 meter Connection Cable Length.



R40 Series Accessory Order Guide

R40 Accessories	
Step 5 - Select: Add Accessories as desired. List as separate line items.	
Part Number	Surface Mount Brackets
16451	R40 Surface Mount Bracket, Fixed, Diameter: 1.77 in. (45mm)
16453	R40 Surface Mount Bracket, Adjustable, Diameter: 1.77 in. (45mm)
Wall Mount Flange	
16483D-44	R40 Series Wall Mount Flange
Air Purge	
16472	R40 Compact Air Purge
Protection Windows for Air Purge	
16465-1	BK7 Protection Window for R40 Models: 1M and 2M with Locking Ring
16465-2	Sapphire Protection Window for R40 Models: 1M, 2M, MT, F4 and G5 with Locking Ring
16465-3	ZnSe Protection Window for R40 Models: P3, MT, F4, G5, P7 and LT with Locking Ring
Air/Water Cooling Jacket	
16460C	R40 Air/Water Cooling Jacket
Sighting Tubes for R40 Optics Code D100, M30 x 1, Length: 11.81 in. (300mm)	
16491-1	R40/60 Series Sighting Tube, 304SS, 1500°F (800°C)
16491-2	R40/60 Series Sighting Tube, Inconel, 2000°F (1100°C)
16491-3	R40/60 Series Sighting Tube, Silicon Carbide, 3000°F (1600°C)
16491-4	R40/60 Series Sighting Tube, High Purity Alumina, (99.8%) 3500°F (1900°C)
16491-5	R40/60 Series Sighting Tube, Glassy Carbon, 5430°F (3000°C)
Thermocouple IR Tube for R40 Optics Code F300, M30 x 1 Length: 11.81 in. (300mm)	
16492-1	R40/60 Series Thermocouple IR Tube, 304SS, 1500°F (800°C)
16492-2	R40/60 Series Thermocouple IR Tube, Inconel, 2000°F (1100°C)
16492-3	R40/60 Series Thermocouple IR Tube, Silicon Carbide, 3000°F (1600°C)
16492-4	R40/60 Series Thermocouple IR Tube, High Purity Alumina, (99.8%) 3500°F (1900°C)
16492-5	R40/60 Series Thermocouple IR Tube, Glassy Carbon, 5430°F (3000°C)
Power Supply	
16116	Compact AC/DC Power Supply, 24V, 31W
16117	AC/DC Power Supply, 24V, 25 to 150W

BESTOBELL
AQUATRONIX
SINCE/DEPUIS 1953

Head Office
2880 Argentia Road, Unit 3
Mississauga, ON L5N 7X8
salesdesk@bestobell.com
1-800-668-3979
www.bestobell.com

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Montréal Office
970 Montée de Liesse, #204
St-Laurent, QC H4T 1W7
ventes@bestobell.com
1-877-331-1225

Atlantic Office
166 North Side Road
Riverport, NS B0J 2W0
dmossman@bestobell.com
902-529-0355



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