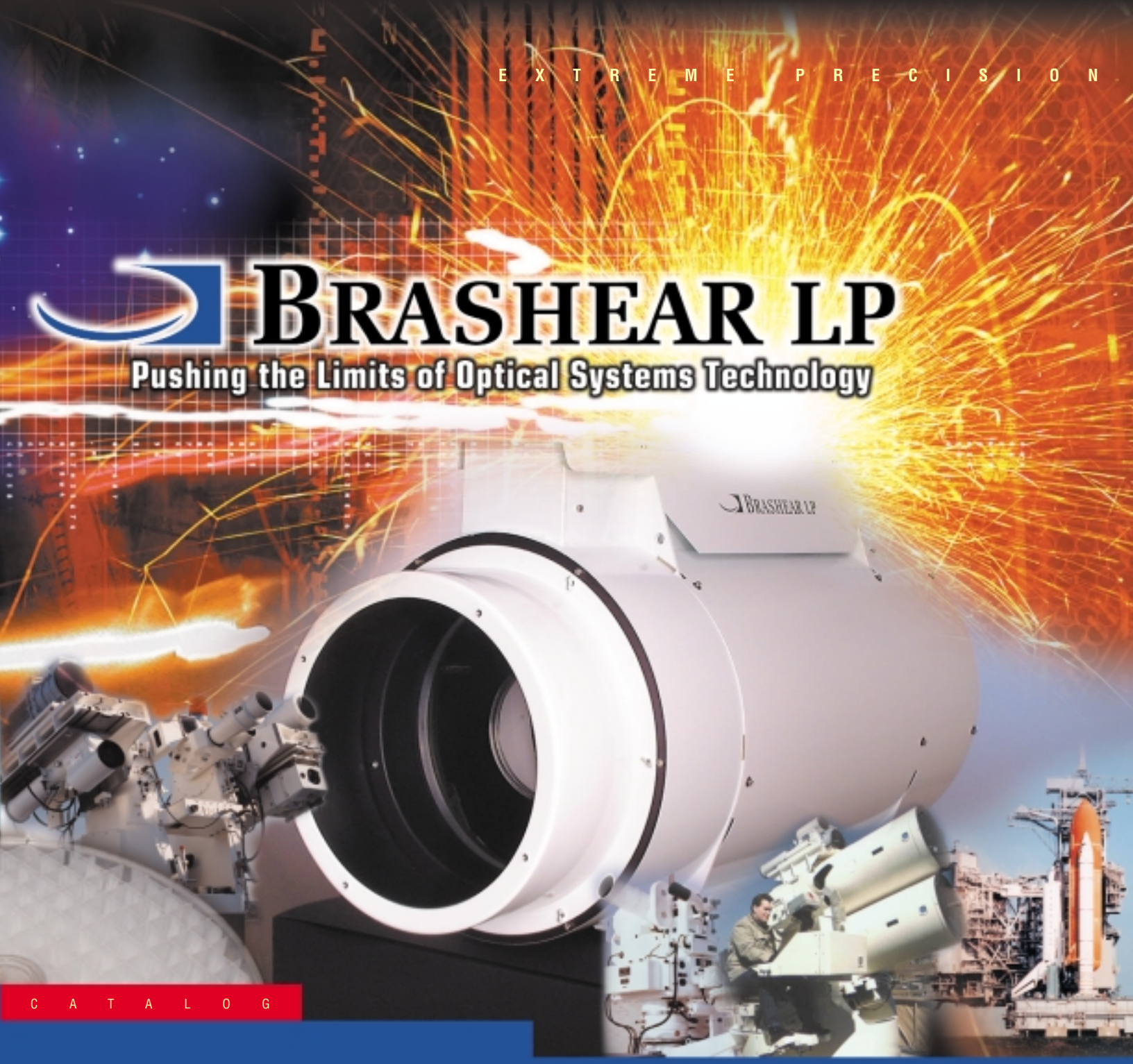
E X T R E M E P R E C I S I O N

BRASHEAR LP

Pushing the Limits of Optical Systems Technology



C A T A L O G

STANDARD RANGE LENSES

SR-50 Lens

SR-100W Lens

SR-150 Lens

Accessories

BRASHEAR LP

SETTING THE STANDARD FOR PERFORMANCE AND RELIABILITY

Optical Systems Technology

Pushing the Limits of Optical Systems Technology

Setting the government performance standards for tracking systems for over 40 years!

Brashear LP has set the standard for quality performance and reliability for Test Range products. In fact, since 1950, they have delivered nearly 600 range instruments and lenses – more than any other company in the world!

PRODUCT OVERVIEW

The Brashear SR-Series Catadioptric objective lenses are available in focal lengths of 50, 100, and 150 inches. The lenses, when mounted on the Kineto tracking mount, are an ideal complement to the sensor suite, producing high quality imagery to either a 70 mm high-speed film camera or a shuttered video camera.

Standard Range Lens

The Brashear SR-Series Catadioptric Lenses are athermalized with Zerodur primary and secondary mirrors and a zero expansion metering structure. The lens designs allow focusing from 500 yards to infinity, while maintaining boresight to within 20 arc-seconds. The optional lens Focus Control Module allows full remote control of the lens focusing.

Each SR-Series lens can be mounted directly on the camera/lens platforms of the Brashear LP Kineto System, as well as on the Photo-Sonics Cine-Sextants, using adapter plates. The lenses, along with accessories such as Barlow Extenders and Focus Control Modules, are covered in detail on the following pages.

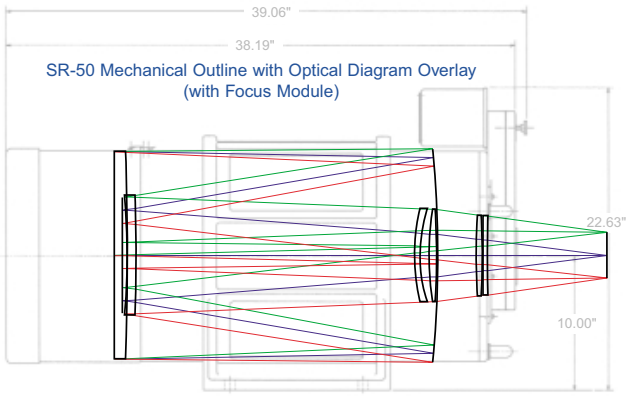
THE WORKHORSE OF TODAY'S TEST RANGES

EXTREME PRECISION

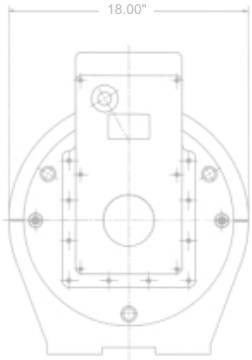
SR-50 Lens

VERSATILE, WIDELY USED

- The most popular SR Lens — widely used throughout the world
- An all-spherical design minimizes aberrations and produces superb images to the corners of the 70mm format.



SR-50 Mechanical Outline with Optical Diagram Overlay (with Focus Module)



COMPANY OVERVIEW

Pushing the limits of Optical Systems Technology has been Brashear LP's focus for over 100 years. Today, Brashear is recognized worldwide as a leading designer and producer of precise electro-optical systems for both defense and commercial applications. Their products include telescope systems, optical components, precision pointing and tracking systems for shipboard fire control, test range instrumentation, small arms fire control and laser beam directors.

Headquartered in Pittsburgh, PA, Brashear provides the scope and flexibility to meet both technically demanding and high-volume production. Comprehensive in-house capabilities for design, engineering, manufacturing, test and logistics support ensure that superior technologies are effectively matched with customer requirements to produce reliable, maintainable products and systems. For more information, visit our Web site at http://www.brashearlp.com.

SR-50 with Focus Module Specifications

Environmental:

– Operating Temperature:	-12° to +50° C Operational
– Humidity:	Non-condensing relative to 95%
– Storage Temperature:	-25° to +50° C

Dimensions:

– Height:	23 in.
– Width:	18 in.
– Length:	40 in.
– Weight:	160 lbs.

Optical Performance:

– Focal Length:	50 in. +/-1%	
– Aperture:	12.5 in.	
– Transmission:	T/5.6	
– Format:	70 mm film	
– Resolution:	Film	Wavefront OPD
On-Axis:	60 lp/mm	<0.125λ RMS at 633 nm
Off-Axis:	35 lp/mm	<0.20λ RMS at 633 nm
– Back Focal Length:	5.69 in. +/- .05	
Focus:	∞ to 500 yds, electrical and manual	
Veiling Glare:	<5%	
Saddle Mount:	Optical Axis	
	10 +/- 0.005 in. above mounting surface	

BRASHEAR LP

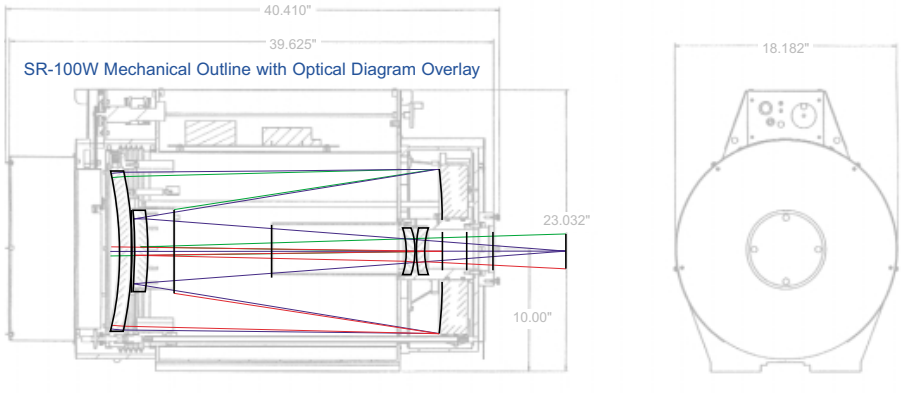
EXTREME PRECISION

Optical Systems

SR-100W Lens

VERSATILE, WIDE SPECTRAL RANGE

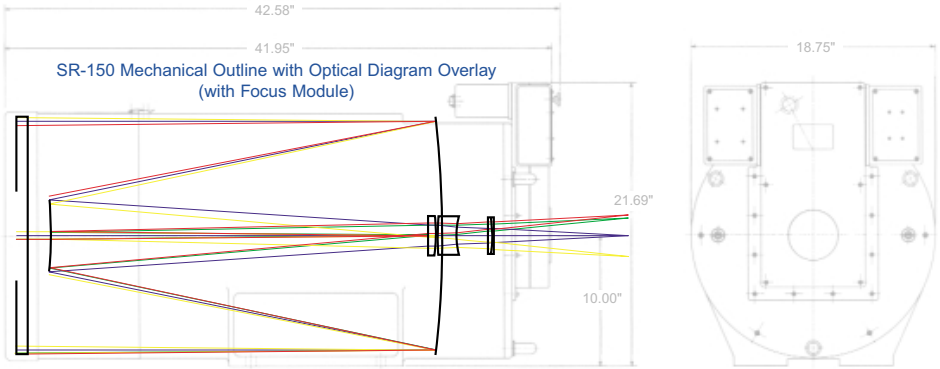
- Easily converted to 50 and 200 focal lengths with optional Barlow Extenders.
- Expanded coverage into the infrared T/12 or better visible to 3.5 μm when ordered with broadband coatings.
- An all-spherical design minimizes aberrations and produces superb images to the corners of the 70mm format.



SR-150 Lens

HIGH MAGNIFICATION

- Ideal for long focal length requirements.
- A Schmidt Cassegrain design minimizes aberrations and produces superb images to the corners of the 70mm format.



SR-100W with Focus Module Specifications

Environmental:

– Operating Temperature:	-12° to +50° C Operational
– Humidity:	Non-condensing relative to 95%
– Storage Temperature:	-25° to +50° C

Dimensions:

– Height:	23 in.
– Width:	18 in.
– Length:	40 in.
– Weight:	180 lbs.

Optical Performance:

– Focal Length:	100 in. +/-1%	
– Aperture:	12.5 in.	
– Transmission:	T/11	
– Format:	70 mm film	
– Resolution:	Film	Wavefront OPD
On-Axis:	40 lp/mm	<0.125λ RMS at 633 nm
Off-Axis:	35 lp/mm	<0.20λ RMS at 633 nm
– Back Focal Length:	6 in. +/- 0.05	
Focus:	∞ to 500 yds, electrical and manual	
Veiling Glare:	<5%	
Saddle Mount:	Optical Axis	
	10 +/- 0.010 in.	

SR-150 with Focus Module Specifications

Environmental:

– Operating Temperature:	-12° to +50° C Operational
– Humidity:	Non-condensing relative to 95%
– Storage Temperature:	-25° to +50° C

Dimensions:

– Height:	22 in.
– Width:	19 in.
– Length:	43 in.
– Weight:	200 lbs.

Optical Performance:

– Focal Length:	150 in. +/-1%	
– Aperture:	15.4 in.	
– Transmission:	T/12	
– Format:	70 mm film	
– Resolution:	Film	Wavefront OPD
On-Axis:	40 lp/mm	<0.125λ RMS at 633 nm
Off-Axis:	35 lp/mm	<0.20λ RMS at 633 nm
– Back Focal Length:	6.5 in. +/- .05	
Focus:	∞ to 820 yds, electrical and manual	
Veiling Glare:	<5%	
Saddle Mount:	Optical Axis	
	10 +/- 0.005 in. above mounting surface	

BRASHEAR LP

EXTREME PRECISION

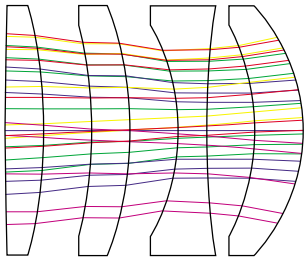
Optical Systems

SR-100W Barlow Extenders

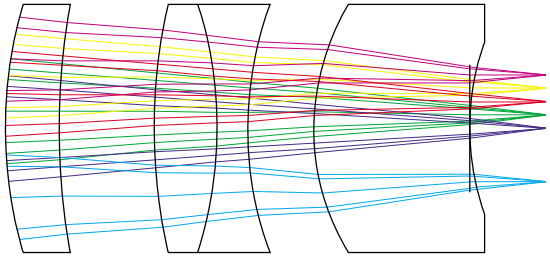
EXTENDED FOCAL LENGTH CAPABILITIES

The 100-inch Barlow Extenders can be attached in the field within 1 minute without breaking the seal of the assembled lenses. Two models are available:

Model #B-100-200 200 inch extended focal length with 70-mm diameter format



Model #B-100-50 50 inch focal length with 35-mm diameter format



Custom Barlow Extenders are available. Please call **412-967-7700** for more information.

Focus Control Modules

IDEAL FOR FIELD UPGRADES

Upgrade your current system with the compact, self-contained serial communications interface, the lens Focus Control Module. The lens Focus Control Module, an embedded microcontroller servo system, positions a focusing element in the Brashear LP series of catadioptric range lenses. It receives commands through a serial communications interface to a host computer and is designed to support a number of different command protocols.

Focus Control Modules Specifications

Environmental:
- Operating Temperature: -40° to +50° C Operational
- Humidity: Non-condensing relative to 95%
- Storage Temperature: -40° to +70° C

Positioning:
- Range: Lens dependent
- Resolution: 12 bits
- Accuracy: Lens dependent
- Modes: Local or remote Focus on range or Focus on position

Interface:
- Electronic: RS-232/RS-422/RS-485, 19200, 9600 or custom baud WSMR (ASCII), China Lake or custom protocol
- Power: 120 VAC or 24 VDC (18-33 VDC)
- Position Input: 10 k multi-turn potentiometer
- Motor Drive: 12-24 VDC PWM
- Analog Inputs: 4 buffered and 2 non-buffered analog inputs available
- Digital Inputs: 5 contact inputs available
- Digital Outputs: 8 TTL DOs available for expansion

Dimensions: (for Models FR-1 and FP-1)
- Height: 6.25 in.
- Width: 8.0 in.
- Length: 5.0 in.
- Weight: 4.5 lbs.

Models:
- FR-1 WSMR protocol, SR-50, SR-100, SR-150
- FR-2 WSMR protocol, SR-100W
- FP-1 NAWC China Lake protocol, SR-50, SR-100, SR-150
- FP-2 NAWC China Lake protocol, SR-100W

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